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VOL. XXXI N°. 2 MARS-AVRIL 1952

LA REVUE AGRICOLE

DE

L'ILE MAURICE

RÉDACTEUR : G. A. NORTH COOMBES

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NOTES ET ACTUALITÉS

Personalia

Nous souhaitons la bienvenue à M. A. de Sornay, de retour d'un voyage en Afrique du Sud. M. de Sornay, comme les lecteurs de *La Revue Agricole* le savent déja, a été invité par le South African Sugar Technologists Association à assister à leur congrès annuel qui eut lieu à Durban du 19 au 22 février dernier. Notre compatriote a présenté à ce congrès une communication sur les travaux d'hybridation et de sélection faits à Maurice. Il eut l'occasion de visiter la Station Expérimentale de Mount Edgecombe ainsi que bien d'autres institutions au Natal.

Nos vœux de bon voyage accompagnent M. Octave Wiehe qui a quitté la colonie en mars pour aller reprendre son poste de Phytopathologiste au Nyasaland après un congé de plusieurs mois passé ici.

M. J. R. Williams, entomologiste de notre service d'Agriculture a obtenu un congé qu'il passera au Royaume-Uni. Nous lui souhaitons bon séjour en Europe.

Nous avons reçu la visite du Dr. Logan, de la branche de recherches du Rockfeller Foundation, qui s'occupe de problèmes démographiques.

Le Dr. Pilet, Vétérinaire Inspecteur général et Chef du Service de l'Élevage et des Industries Animales de Madagascar, est venu discuter avec les autorités locales la question d'importation de bœufs de boucherie.

Le Dr. F. J. Simmonds, entomologiste en chef du Commonwealth Institute of Biological Control des Indes Occidentales, nous est arrivé pour une période de 10 jours afin de constater les résultats qui ont été obtenus localement avec les parasites expédiés de Trinidad pour la lutte contre les borers de la canne à sucre et le cordia. Il va aussi faire des recommandations relatives à la lutte biologique qui pourrait être entreprise contre plusieurs de nos insectes nuisibles, notamment le Clemora, les borers de la canne et les insectes s'attaquant à l'embrevade.

La récolte probable en 1952

Les perspectives sont fort belles. Le pays, a, nous l'espérons, échappé aux déprédations d'un cyclone. Même si le tonnage global de cannes n'atteint pas celui de l'année dernière, compte tenu de l'augmentation de la superficie à récolter, il est probable que nous produirons autant de sucre qu'en 1951, si les conditions de maturation sont normales. Il est à souhaiter que la floraison des cannes soit moins intense que l'année dernière.

FERTILIZER PRACTICE AND INVESTIGATIONS IN THE SOUTH AFRICAN SUGAR INDUSTRY*

By J. L. DU TOIT.
S. A. S. A. Experiment Station, Mount Edgecombe.

General Responses to N, P and K.

The soils of South Africa are in general very deficient in available phosphates and the approximately 480,000 acres of land now under sugarcane in a narrow somewhat broken coastal strip of 200 miles in Natal, are no exception. Rather spectacular increases in yields were therefore obtained in the first phosphate trials conducted in the sugarbelt. These results were later confirmed by the large number of fertilizer experiments carried out by the Experiment Station. The application of about 600 lbs. to 800 lbs. of superphosphate per acre at, or before, planting is therefore, with the exception of the alluvial flats where little or no response could be demonstrated, the accepted practice and the more soluble superphosphate is generally favoured.

For some reason the value of nitrogenous fertilizers was shown much later. The response to nitrogen is, however, very general and its importance realized. Even on the fertile alluvial flats, good responses have been obtained, although nitrogen is not yet in general used here. In general 50 to 80 lbs. of nitrogen (N) per acre is recommended and this is applied as a top-dressing to ratoons, in spring or early summer. A somewhat lighter nitrogen dressing can be given to plant cane where no leguminous crop has been ploughed in, but it is normal practice to grow and plough in a crop of sunhemp or velvet beans before planting and a further nitrogenous application is then considered unnecessary for the plant cane crop.

Potash responses have been found, in the past, in most soil types, but the increase in yields was often small and more often than not no significant gains could be demonstrated and consequently potash has not been normally included in the fertilizer programme except in so far as fertilizer mixtures might contain a certain percentage of potash. Most of the sugarcane soils are however, not excessively high in exchangeable or available potash and quite a number are low or very low. At the same time, the potash drain in molasses is being continued at the rate of approximately 70 lbs. K_2O per acre per crop and potash deficiency symptoms have become fairly common.

Supply Position :

It is fortunate that South Africa has the necessary factories for ma-

* Assemblée Générale du 25 janvier 1952 de la Société des Chimistes et des Techniciens des Industries Agricoles de Maurice.

nufacturing superphosphate from imported rock phosphate and sulphuric acid made largely from imported sulphur but also from iron pyrites a by-product or waste product from our gold mines. The total capacity of the local factories is above 600,000 tons a year; but the country is largely at the mercy of foreign sources for raw materials. Extensive apatite deposits have recently been taken over by the Government with the intention of concentrating the phosphates and using them for superphosphate production. Restriction on the importation of sulphur has directed our attention once more to our own pyrites. As a result of sulphur import restrictions, pure superphosphate is at present virtually unobtainable and mixtures containing 3 parts of super and 2 parts of rock phosphate, or 4 parts super and 1 part of rock are sold.

It was hoped that South Africa would by now be able to draw appreciable quantities of nitrogenous fertilizers from our synthetic ammonia plants, but the rapid expansion of our mining industry has necessitated the use of all the nitrogen for explosives and very nearly all the nitrogenous fertilizers have to be imported. It is hoped, however, that South Africa would be self-sufficient in the near future in this important plant food.

Potash fertilizers are mainly imported, but in recent years two factories distilling alcohol etc. from molasses had started recovering the potash from the dunder. If all potash were recovered from our molasses it would amount to the equivalent of more than 11,000 tons of muriate of potash or about the total consumption of potash in the Union. It is however, likely that potash consumption will increase in future.

Before the last world war there were numerous artificial fertilizer mixtures on the market, but during the war the Government restricted these to the following 8 standard mixtures of guaranteed composition.

Mixture	Percentage Composition			Price at end 1951
	Nitrogen (N)	Phosphate (P_2O_5 Citric Soluble)	Potash (K_2O Citric Soluble)	
A	0	14	6	£ 12. 5.6.
B	2	12	6	13.16.6.
C	2	14	2	13. 6.0.
D	3	13	3	14. 9.6.
E	4	14	0	15. 2.0.
F	4	10	6	15. 7.6.
G	6	10	3	16.16.0.
H	8	10	0	18. 4.6.

The planter gets a Government subsidy of £1/-/- per ton of 2,000 lbs. of standard mixture or straight fertilizer bought so that he will pay £11/5/6 per ton of A mixture. He can also get some of these mixtures containing ½ the total amount of nitrogen in the organic form at extra cost.

The prices of straight fertilizer at the end of 1951 were as follows :—

Super and rock phosphate 3 : 2 (15.5 % citric sol. P_2O_5)	£ 8. 18. 6.
„ „ 4 : 1 (17 „ „ „ „)	10. 5. 0.
Muriate of potash	23. 17. 6.
Ammonium sulphate	27. 10. 0.

It will be seen that the unit price of fertilizer ingredients is appreciably higher in the mixtures than in the straight fertilizers. There is in fact a mixing charge of about £2/10/- per ton for these mixtures.

Prices of fertilizers have of course increased very rapidly in recent years, but then there was a corresponding increase in the price of cane.

The following two tables show the increase prices of fertilizers and of sugarcane in South Africa :

Year	Ammonium Sulphate	Super	Muriate of Potash
1931 ...	£ 12. 0. 0.	£ 4. 4. 0. (19 per cent)	£ 12.15. 0.
1936 ...	7.17. 6.	3. 0. 3. „	9.16.10.
1941 ...	16. 0. 0.	5.10. 0. 18 „	—
1946 ...	20. 0. 0.	7. 0. 0. „ 5.18. 0. 15 „	23. 7. 6.
1951	24. 6. 0. 27.10. 0. 27.10. 0.	8.18. 6. 15.5 „ 8.18. 6. 15.5 „ 10. 5. 0. 17 „	22. 5. 6. 23.17. 6. 23.17. 6.

The subsidy of £1/-/- per ton was operative from 1941 on.

	Average price of cane.
1931	£ 0. 12. 10.40
1936	0. 15. 10.29
1941	0. 18. 11.50
1946	1. 8. 4.06
1951 ... ... About	1. 13. 11

In spite of the fact that mixtures are more expensive per unit than straight fertilizers and also that phosphates are best applied in the furrow at the time of planting and nitrogen later as top-dressings, some of the mixtures have become very popular. Thus D mixture for planting and G

and H mixtures for top-dressings are much favoured by the planters. During 1950 the following approximate quantities of fertilizers were used in the sugar industry :—

10,000 tons of superphosphate
10,000 tons of 3 : 2 super-rock phosphate
30,000 tons of mixtures
1,400 tons of nitrogenous fertilizers calculated as N
10 tons of muriate of potash.

It is not possible to say how much of each standard mixture was used but it is quite clear that mixtures are popular, that planters are aware of the importance of phosphates and to a lesser extent nitrogenous fertilizer, but that potassic fertilizers are hardly used at all. I think, however, that more muriate and more mixtures containing the higher percentages of potash will be used in future.

Organic Manures :

In addition to the standard mixtures there is also on the market a number of organic fertilizing materials. Exact details are not known but appreciable quantities are sold. These are, however, low grade fertilizing materials seldom containing more than 3 per cent of nitrogen, phosphate or potash and they are relatively expensive.

Other Fertilizer Materials :

All the filter cake produced in the industry is of course applied to the cane fields and in the case of filter cake from the sulphitation factories a dressing of 10 tons per acre is quite normal whereas as much as 30 to 40 tons of carbonatation cake is often applied. The composition of filter cake differs of course somewhat, but dry sulphitation cake contains about 3 per cent citric soluble P_2O_5 and nearly 1 per cent nitrogen, while carbonatation cake averages about 0.8 per cent available P_2O_5 and about 0.3 per cent nitrogen. From the rate of application it will be seen that filter cake is applied somewhat selectively — the more fertile areas and areas further away from the factory seldom getting any. The result has been that as a consequence of the heavy filter cake applications the phosphate content of the soils has been built up in some areas and where heavy dressings of carbonatation cake have been applied to sandy soils the *p*H has increased from about 6 to 8 and even 9. Chlorosis has become a common occurrence in young ratoons during the spring and early summer months, but no further ill effects from this high *p*H has been noticed.

During the war years when fertilizers were in short supply some planters started using sheep and goat manure sold under the name of Karroo manure. This manure accumulated over many years in kraals where

the animals were kept at night and under the very dry conditions leaching was reduced to a minimum. Karroo manure is very rich in potash containing as much as 4 to 5 per cent available K_2O, about 1 per cent available P_2O_5 and 1½ per cent nitrogen. It is, however, high in chlorides and carbonates and the *p*H often over 10. This Karroo manure was very cheap, selling at 16/6d. per ton and 5 to 10 tons were applied per acre with remarkably good results in certain areas. It is of interest to record that the best results were obtained in acid and somewhat sandy areas with a high rainfall and where potash in the soil was low.

In fact potash deficiency symptoms are fairly common in this area where no Karroo manure had been applied. Potash therefore, probably played an important part in bringing about these increases in yields. Karroo manure is still being applied but the supply is getting less.

Composting is practiced to some extent in the industry and good responses are obtained from its application, but the process is expensive and the amount used, and this also applies to farmyard manures, is insignificant at present. In this connection it must be pointed out that trashing is the common practice in the industry and top-dressings of fertilizers are often given over the trash blanket. A number of analyses done recently indicated that organic matter has been increased appreciably as a result of this practice over a number of years, and that the crumb structure of the soil has been built up. It is not, however, claimed that the crumb structure has necessarily improved as a result of increased organic matter.

A phosphatic material sometimes used in the industry is a local rock phosphate called Langfos. This material contains 17 per cent total phosphate and 7 per cent available phosphate as P_2O_5. There may be some advantage in using a cheaper, if less pure and less soluble material, such as this on our heavier soils where phosphate fixation is rapid, but results have been rather erratic. Long term experiments are however now in progress which might throw further light on the subject.

Fertilizer Trials :

Fertilizer field trials involving the normal careful planning and different designs have now been carried out by the Experiment Station for the past 25 years. A number of similar experiments has also been done by other concerns. At present about 15 exploratory 3 × 3 × 3 NPK experiments are being put down for this season on the main soil types. Long term experiments to test out the value and availability of phosphatic fertilizers are in progress In this series of experiments normal superphosphate, granular superphosphate, filter cake (both carbonatation and sulphitation) imported rock phosphate, the local Langfos phosphate, mixtures of imported rock phosphate and superphosphate, meta phosphate and magnesium silico phosphate which is high in citric but exceedingly low in water soluble phosphate, are being compared.

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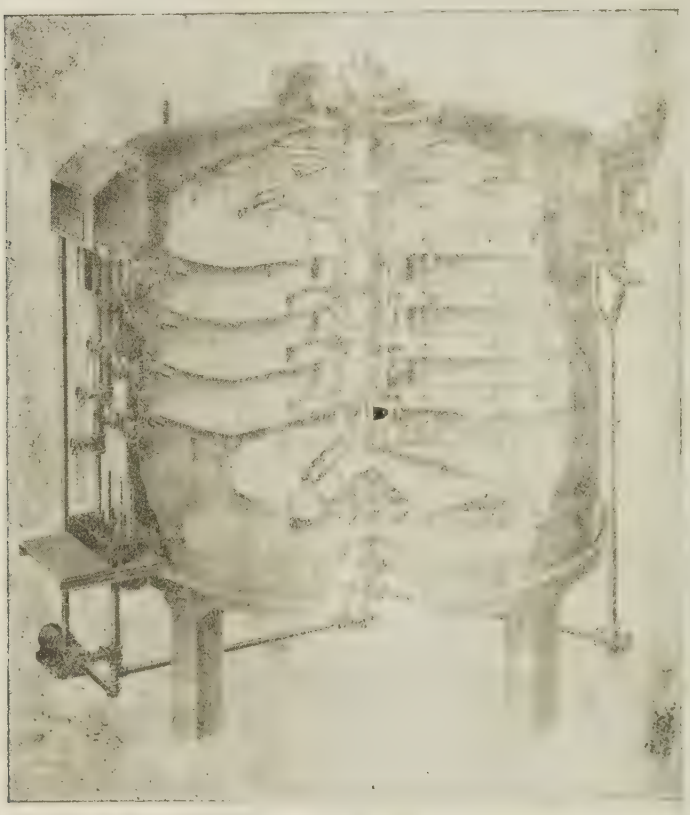

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The effect of varying quantities of nitrogen and split applications on yield and sucrose percentage is another subject which is now again being studied. Next year the efficiency of various forms of nitrogen (both inorganic and organic) will be tested out. Two experiments have been carried out with anhydrous liquid ammonia. The one experiment unfortunately showed no nitrogen response in whatever form, whereas in the other the anhydrous ammonia gave superior yields compared with the normal forms of nitrogen. It is possible however, that the control of the gas was not perfect and somewhat higher quantities than intended could have been used. It was quite obvious however, that liquid ammonia could easily be used, is absorbed very readily, has no harmful effect and of course it should be much cheaper than ammonium sulphate or nitrate per unit of N. It is however, difficult to see how it can be used on ratoons after trashing and leaving the trash as a blanket in the field.

In a recent potash trial an excellent response was obtained using as much as 200 lbs. K_2O per acre. The treatment also had a significant residual effect on a later ratoon. It is however, somewhat surprising, in view of the obvious potash deficiency in certain areas and soil types that potash responses have not been obtained more often in the past. Small patches of cane showing potash deficiency symptoms are often seen and sometimes whole fields are involved. I have seen a field which according to records gave a reasonable plant cane and ratoon crop and then suddenly the new ratoon failed almost completely and the cane started dying off in patches. Deficiency symptoms were acute, potash in the leaf and exchangeable potash in the soil extremely low. A potash top-dressing saved what was left of the crop and the symptoms disappeared, but it does seem strange that the yields had not gone down more progressively and were not poorer prior to this last crop.

The soils of the sugarbelt are with few exceptions acid and *p*H values as low as 5 to 5.4 common in some areas where the soils are leached and low in bases particularly calcium and yet no appreciable gains from liming has yet been demonstrated. These experiments are being continued and it is felt that further investigations should be carried out. Sugarcane grown in pot tests often shows spectacular increases as a result of liming.

Fertilizer Effect on Sucrose.

In most sugarcane producing countries nitrogen application leads to a decrease in sucrose percentage and where potash responses are obtained the sucrose per cent is generally increased. Full chemical analyses of the cane from experimental plots are made at the Experiment Station, but here it is found that the sucrose and quality of the juice is very seldom affected by normal fertilizer application. I can think of only about two instances where a nitrogen application has lead to a significant reduction in sucrose per cent cane. The reason may of course be that cane is not normally harvested till after two years and that we get cold dry winters

which allow cane to ripen well. The sucrose per cent cane and juice quality were certainly improved significantly in the potash trial referred to earlier on but as stated good responses to potash have been rather the exception in the past.

Pot Experiments :

Mitscherlich pot tests have been tried in the past with good results, but we are at present using quicker or more direct methods.

Sugarcane sets are planted and fertilized in Mitscherlich pots and later harvested and weighed. The preliminary results have been rather encouraging. The Jenny technique using lettuce as an indicator plant is also being tried. This method has the advantage of being quick, the results can be obtained in 4 to 6 weeks and a relatively small amount of soil is required. First results seem fairly good, but it appears as if the amounts of nitrogen and perhaps potash equalling 200 and 100 lbs. N and K_2O respectively may be excessively high for some of our light sandy soils. We intend running these pot tests using both cane and lettuce on all soils from fertilizer experiments for some time.

Soil Classification :

On the whole our soils correspond very closely indeed with the geological formations from which they are derived and this simplifies the work of classifying the soils a great deal. The soils are classified on the characteristics of the decending profile and in one and the same geological formation differences do occur and different soils series are obtained. On some of our more moist and higher altitude soils climate has played such an important part as to make the geological origin of somewhat secondary importance in soil classification. The main soils of the sugar-belt are soils derived from granite, from a sandstone formation, from a glacial conglomerate, from a shale formation, from basic igneous basalts and dolerite and then we have a recent sand formation along the coast and alluvial deposits near river mouths. Although soil fertility and responses to fertilizer differ a great deal within soil types depending on past treatment etc., soil classification is of great value. Thus in general the soils derived from the basalts and dolerites are very low in phosphates, phosphates are readily fixed and these soils respond well to phosphatic fertilizers. Soils derived from the so-called Table Mountain Sandstone are often deficient in potash and the mist belt soils from our higher and colder areas do not so readily respond to nitrogen as the other soils. The alluvial soils are of course the most fertile and fertilizers are seldom used although there are indications that the older alluvial flats are falling in fertility and that some fertilizers would have to be applied in future.

Soil Analyses :

The analysis of soils and general investigations such as phosphate

fixation, crumb structure etc. are also regularly in progress and particularly so on fertilizer and management experiments. The normal methods of soil analysis to do citric soluble plantfoods exchangeable cations etc. are being used, but recently more attention has been given to an examination of some rapid methods of soil analyses. The methods of Bray with some modification seem to give very good results and high correlations are found between potash, calcium and magnesium done by this method and their exchangeable values. It was found that the phosphate results using citric acid, Morgan, Spurway, Troug and Bray extracting solutions run in general parallel, but the Morgan method gives decidedly higher relative values for our basalts and dolerites than are indicated by the other methods.

Leaf Analyses :

Leaf analyses, using the whole third leaf blade, are being done to study fertilizer and cultural practices for identifying nutritional deficiencies and to collect data on variations in leaf composition with age, season, variety, etc. This method has proved excellent for indentifying potash deficiencies and the potash nutritional status of the plants. In fact nearly all the potash deficient areas have been discovered by this method. The antagonism between potash and calcium and perhaps magnesium is of course well known and in the South African sugar area the potash magnesium antagonism is very pronounced and generally more apparent than the potash calcium antagonism. Areas where phosphates have apparently been built up to a high level have also become apparent as a result of leaf analysis, but further investigations are necessary and particularly on the effect of minor element deficiencies on the N, P and K level in the leaves.

Some C.S.I.R. - Experiment Station Projects :

The Council for Scientific and Industrial Research, Pretoria, is playing an increasingly important part in research in South Africa and our industry is also benefiting from its activity. Thus the identification of the clay minerals of the sugarbelt soils are at present being undertaken by the C.S.I.R. The preparation of these clay fractions and the chemical analyses were done at the Experiment Station and the fractions then sent to Pretoria for further study. Similarly it is hoped to carry out a joint C.S.I.R. - Experiment Station investigation on the minor element situation in the sugarbelt in the near future. From our own work chlorosis seems to be due to a low iron/manganese ratio and there may be the other minor element deficiencies or abnormalities and it is hoped that this survey of both leaf material and soils and perhaps the cane plant itself will increase our knowledge considerably. Radio active phosphates can also now be obtained from the C.S.I.R. and it is hoped to investigate phosphate uptake, phosphate fixation etc. more thoroughly in the near future with the aid of this new technique.

Conclusion :

Fertilizer plays a very important part in the agricultural practice of sugarcane in South Africa, as, of course, it does in Mauritius. There are many points of similarity but there are also marked differences between these two countries. Our experiences and general practice as regards the application of nitrogen and phosphate are much the same. In South Africa however, potassic fertilizers have, I think, been neglected whereas in some areas in Mauritius perhaps excess quantities have been applied. In Mauritius where on the whole fertilizer practice has been very sound, foliar diagnosis as now conducted seems to be an ideal control measure. In South Africa I hope a similar method may be of far more immediate value because the fertility of our soils are naturally much lower, more variable than yours and past practice has certainly not been ideal.

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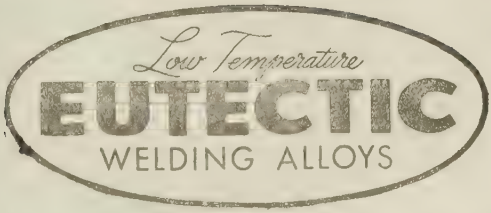

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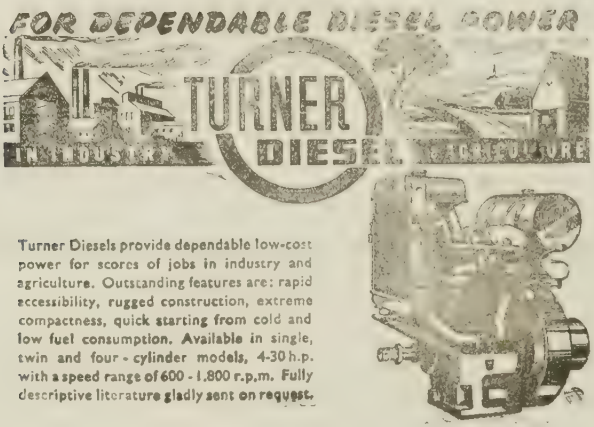

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SOME ASPECTS OF STEAM ECONOMY IN THE CANE SUGAR INDUSTRY

P. E. BOUVET, B. Sc. (Eng.)

In his communication on " The Use of Steam in our Sugar Factories " Mr. L. J. Coutanceau, of regretted memory, showed clearly how the problem of Steam Economy should be tackled in sugar factories. At the time of his original publication on this matter in 1927 many factories had a poor steam balance and, in spite of the fact that the cane ground had a high fibre content, a large amount of extra fuel, in the form of wood, was being used to keep the factories going. A great deal of improvement has taken place since, mainly through the efforts of Mr. Coutanceau and his colleagues, and at the present time it is seldom that wood is burnt in raw sugar factories. This very commendable achievement has been made possible mainly through the replacement of triple effect by quadruple effect evaporators and also through vapour heating of the juice in high velocity juice heaters.

However, though it can be safely asserted that in spite of the low-fibred cane grown in Mauritius nowadays the raw sugar factories are self-sufficient as far as fuel is concerned, it is nevertheless true that in many instances the steam balance is precarious and the factory supervisors know too well the difficulties they encounter almost daily trying to maintain the production in full swing with a lowering steam pressure in the boiler house!

Very often steam troubles can be traced back to the single fact that the boilers are greatly overloaded. The overloading may be due fundamentally to an inadequate heating surface but it may also be at least partly due to a wastage of steam in some department of the factory or to a defective distribution system. Overloading decreases the efficiency of boilers — as is very clearly shown in Mr. Coutanceau's work. It follows that if the heating surface is insufficient for a given capacity of the factory, more bagasse will be necessary for steam raising than it would have been the case had the heating surface been larger and consequently the overload smaller. The author knows of a case where a factory which had barely enough bagasse for its own steam requirements, showed a large excess the following year when the boiler heating surface was increased and consequently the overload on the boilers diminished.

As Mr. Coutanceau pointed out, it is a great pity that our factories so far have no facilities for metering their steam output. Undoubtedly steam meters — which are reliable when properly installed — would be of great help to the operatives in charge of the boiler houses and to the engineers whose responsibilities are to improve and design power plants in our factories. It is perhaps through this lack of reliable information that Mr.

Coutanceau quotes a figure of 625 Kgs of steam/T.C.H., as being the average requirement of a raw sugar house. This figure seems high in the light of more modern data and we think that 500 Kgs/T.C.H. is a better average figure for designing, which moreover leaves a reasonable safety margin in practice.

The Importance of Steam Saving.

It can be argued that steam saving is of little importance to our Sugar Industry seeing that we do not pay for our fuel and that up to now no use has been made of our surplus bagasse. This may be quite true in those instances where the factory managers are quite satisfied with the steam balance of their factories and are convinced that nothing can be gained, directly or indirectly, by a steam saving campaign. To these privileged people this article is not intended, but it is hoped that it may prove of some interest to those who are faced with the steam problem. One should bear in mind that a factory which is enjoying a sound steam balance to-day may be in quite a different position in the future if for example a new and richer cane variety becomes popular having a lower fibre content than our famous M 134/32.

The following are some of the reasons which may prompt a factory engineer to embark in a steam saving campaign:

1) When a factory requires extra fuel to produce its own steam requirements. This case, fortunately, is becoming increasingly rare in Mauritius in spite of the fact that the average fibre content of our cane is on the down-grade (this being mostly due to the disappearance of such varieties as BH 10/12, Big Tanna, Co. family etc. and their replacement by the low-fibred M 134/32).

2) When a distillery is operated in conjunction with a sugar factory. It is obvious that the factory should provide all the steam for the distillery during the crop and there is no doubt that it would pay to save as much bagasse as possible for the purpose of operating the distillery during the intercrop, without having to use wood fuel. The latter is very expensive nowadays and moreover the timber stock of the Island is being depleted very fast.

3) When an increased capacity of the factory is envisaged. Steam boilers are expensive ; even our ordinary multitubular boiler are quite so when the cost of all the accessories and brickwork is taken into consideration. In the case of factories already operating on water-tube boilers, the addition of another unit is a very expensive item. Thus even in the case of a factory having a surplus of bagasse it would pay not to waste steam, but on the contrary, to make the most of the existing facilities.

It must be clearly understood that steam saving cannot perform the miracle of reducing the steam consumption of a factory below the critical minimum, which is the amount of process steam required to heat, and evaporate the juice in the evaporator and the vacuum pans. This critical minimum however can be decreased by the proper use of vapour heating and that of the pre-evaporator.

Steam Pressure, Thermal Efficiency and the Role of the Reducing Valve.

The thermal efficiency of prime movers is not of great importance in the Sugar Industry, where the weight of process steam required is usually such that, even with low performance engines, (this does not mean engines in poor mechanical condition) the amount of exhaust steam going to process is insufficient and consequently has to be made up with live steam. In fact there is no excuse for installing a highly efficient steam engine (reciprocating or turbine) in a sugar factory unless one has the intention of producing power for use outside. The first cost as well as the maintenance of these engines are high.

There is also no justification for the use of " high " pressure steam (i.e. above 250 p.s.i.g.), and high degree of superheat, since all the steam finally has to be reduced to process level and desuperheated. It is a point worth noting that superheating actually decreases the steam output of a boiler and therefore cannot help in bagasse saving even in those cases where this is highly desirable.

Highly efficient prime movers in a sugar factory invariably mean reducing valves in parallel with the engines. One is then faced with the ridiculous situation in which an engine is using the minimum amount of steam (i.e. is performing a great steam economy) whilst there is a reducing valve operating simultaneously which is wasting as much energy as it possibly can by throttling high pressure steam to process pressure in order to make up for the insufficiency of exhaust steam coming out of the too efficient prime movers.

A glance at the Mollier diagram for steam will convince anybody that a reducing valve especially when working between high pressure level and process level is a great waster of energy. Moreover reducing valves are very noisy. It is true that reducing valves are unavoidable in most modern installations, but it is also true thay they can prove very useful when they are used with the purpose of giving flexibility to the steam distribution system. As regards superheat there should be just enough of it to ensure a supply of dry steam to the prime movers, since superheat will only increase their thermal efficiency (and also prove extremely troublesome to their lubrification) and thus cause more steam to be throttled in the reducing valves. In other words, as much of the live steam as is reasonably possible should be reduced to process level in the prime movers.

The writer believes that for water tube boilers the reasonable range of pressures for a cane sugar factory lies between 150 and 250 p.s.i.g. and that the degree of superheat should not exceed 50 °C.

The Principal Steam Saving Techniques and Devices.

1) *Vapour heating of juice through bleeding of first and second vessels of the evaporator.*

Mr. Coutanceau has made an extensive study of this particular aspect

of the steam saving technique, the consequence of which has been that vapour heating of juice has become standard practice in Mauritius, with the excellent results that we know. No more need be said about this.

2) *The Pre-evaporator.*

It is true that the concept of pre-evaporation is not new and Mr. Coutanceau mentioned this as early as in 1927. However, its modern application, apart from permitting large steam savings also permits great savings in capital expenditure when increasing the capacity of a sugar factory. This economic aspect though of great interest, falls unfortunately beyond the scope of this article.

Modern Puerto Rican and Cuban practice is to have large pre-evaporators which utilize the whole of the exhaust steam of the factory whilst the vapour coming from it is used by the evaporator, the pan station and the juice heaters. Hence in effect, the evaporation is conducted in quintuple effect and the pan boiling with double effect steam. It does not take much imagination to convince anybody of the very important steam savings that can be effected with such an installation. Let it be mentioned in passing, that increases in evaporator capacities of the order of 60 o/o have been accomplished in some factories when large pre-evaporators have come into use.

There is hardly any need to emphasize the fact that — for very obvious reasons — a pre-evaporator cannot be successfully operated on an exhaust pressure of less than 10 p.s.i.g., 15 p.s.i.g., being the optimum pressure.

3) The Ruths Steam Accumulator.

This remarkable apparatus is a great steam saver in any process where fluctuations in the steam demand occur, such as in sugar boiling. The amount of fluctuation naturally varies for different factories according to the degree of efficiency of the pan station (i.e. number and types of pans, method of graining, efficiency of the operatives, etc.). Every factory supervisor knows too well the effects that these fluctuations in the steam demand may have, especially in those cases where the boiler plant is already overloaded : the pressure drops at the boilers, leading to a greater steam consumption of the prime movers. This in turn tends to lower the steam pressure further and a vicious circle is thus started.

In order to avoid this bad state of affairs which always leads to a diminished throughput and to inferior quality of the final product, factory designers have to take into consideration the probable peak load of the factory and base their calculations of boiler capacity on this probable maximum demand.

With the Ruths steam accumulator however, the picture is quite different : both the live steam and process steam pressures remain constant at the required levels for a large range of varying conditions and since all the peaks are met by the steam in storage within the accumulator,

the boiler capacity can be worked out according to the true average steam consumption of the factory. It is also evident that the accumulator has a direct beneficial effect on the boilers themselves by ironing out the peaks of the boiler load. A peaky boiler load always results in diminished boiler efficiency, accompanied by the production of wet steam which is both undesirable and dangerous. In other words, with an accumulator in operation, one obtains the maximum output from the boiler house.

The only criticism that can be levelled against the steam accumulator is that it is expensive, especially here in Mauritius where the freight rate on such voluminous machinery is enormous.

Should a factory manager ever envisage the installation of a steam accumulator, he would be wise to meter the steam output of his boiler plant and to obtain continuous recordings of the steam pressure, both in the high and low pressure mains, for at least one crop season prior to ordering since these data would be of great help to the Ruths design engineer. The latter would then be in a position to work out the most suitable design for that particular job.

4) *Electrification as a means of reducing steam losses.*

Most of our factories are old and have been enlarged and improved over a period of many years.

Sir Oliver Lyle in his excellent book on the " Efficient use of Steam " points out with a good deal of humour that though every other thing is carefully planned and attended to when improving an old factory, the steam distribution system usually just " happens ", the result being incredible pipe entanglements and... waste of good steam.

By replacing the steam driven pumps and the smaller steam engines of a factory by appropriate electrical equipment, the problem of poor steam distribution disappears.

Poor steam distribution is always accompanied by unduly large condensation, convection and radiation losses. It can be argued of course that these losses could be largely avoided, in the live steam piping at any rate, by using a slight degree of superheat and by careful insulation. It is the writer's belief however that an electric cable is often a better proposition than two steam pipes (one for live steam and one for the exhaust).

It must not be inferred from the above that we are suggesting complete electrification of our sugar factories ; we are only stating the fact that a well studied partial electrification prevents the steam wastage usually associated with poorly designed piping installations.

Proposed steam layout for a Factory whose capacity is to be increased from 85 T.C.H. to 150 T.C.H.

In this project maximum use has been made of existing facilities in order to keep the capital expenditure as low as possible without however impairing the efficiency of the future installation. No steam

accumulator is incorporated in the project for financial reasons. The combination of water-tube and multitubular boilers is intended to give to the system the maximum flexibility possible short of a steam accumulator. The " High Pressure " steam will render the addition of an accumulator possible at any time.

The diagram is self-explanatory. The whole steam distribution is entirely automatic, yet simple.

It must be borne in mind that the author of this project had no data regarding the live steam consumption of the factory at the grinding rate of 85 T.C.H., nor did he know exactly the steam output of the multitubular boilers. Consequently he had to use average accepted figures regarding the steam raising capacity of boilers.

With the turbo-alternator working at its normal load, the weight of steam to be reduced through the 250/125 reducing valve will be about 13 tons/hr, which is not an excessive amount. The reduced steam will have a beneficial effect on the 125 p.s.i.g. steam by drying it up at least partially. The reducing valve 125/10 which by-passes live steam direct to process level is not intended to be working all the time but only occasionally when the pans will be drawing heavily on the process steam main. It will be observed that a maximum of 62 tons of 10 p.s.i.g. process steam should be available /hr, but seeing that only 56 tons/hr will be needed for the pre-evaporator, the balance will be reduced to 5 p.s.i.g. by means of a balanced valve operated by a Mason regulator. The pre-evaporator is to feed the pans through an over-flow valve whose purpose will be to ensure that the pressure in the vapour main from the pre-evaporator does not drop below 5 p.s.i.g. Should this tend to happen, the Overflow valve will close partially or completely, thus favouring the evaporator at the expense of the pan station. Should the pans be short of steam at that moment, the reducing valve 10/5 will open more fully. If by doing so this tends to lower the pressure in the 10 p.s.i.g. main the 125/10 reducing valve will come into operation until the situation comes back to normal. If on the other hand the pan station should decrease suddenly its steam demand, the reducing valve 10/5 will close, the Overflow valve will open in full and steam will blow out through the safety valve on the vapour main of the pre-evaporator to avoid pressure building in the latter's vapour space, since this would slow down its rate of evaporation and consequently deprive the evaporator of its required amount of vapour.

Another important aspect of the scheme is that the water-tube boiler will be fired at a constant rate, which will ensure maximum efficiency and the steam output regulation will be operated on the fire-tube boilers (which are more flexible) using the ordinary draft regulator.

N. B. — All calculations pertaining to this project have been omitted on purpose, in order to avoid inflicting on the reader the tedious task of reading through them.

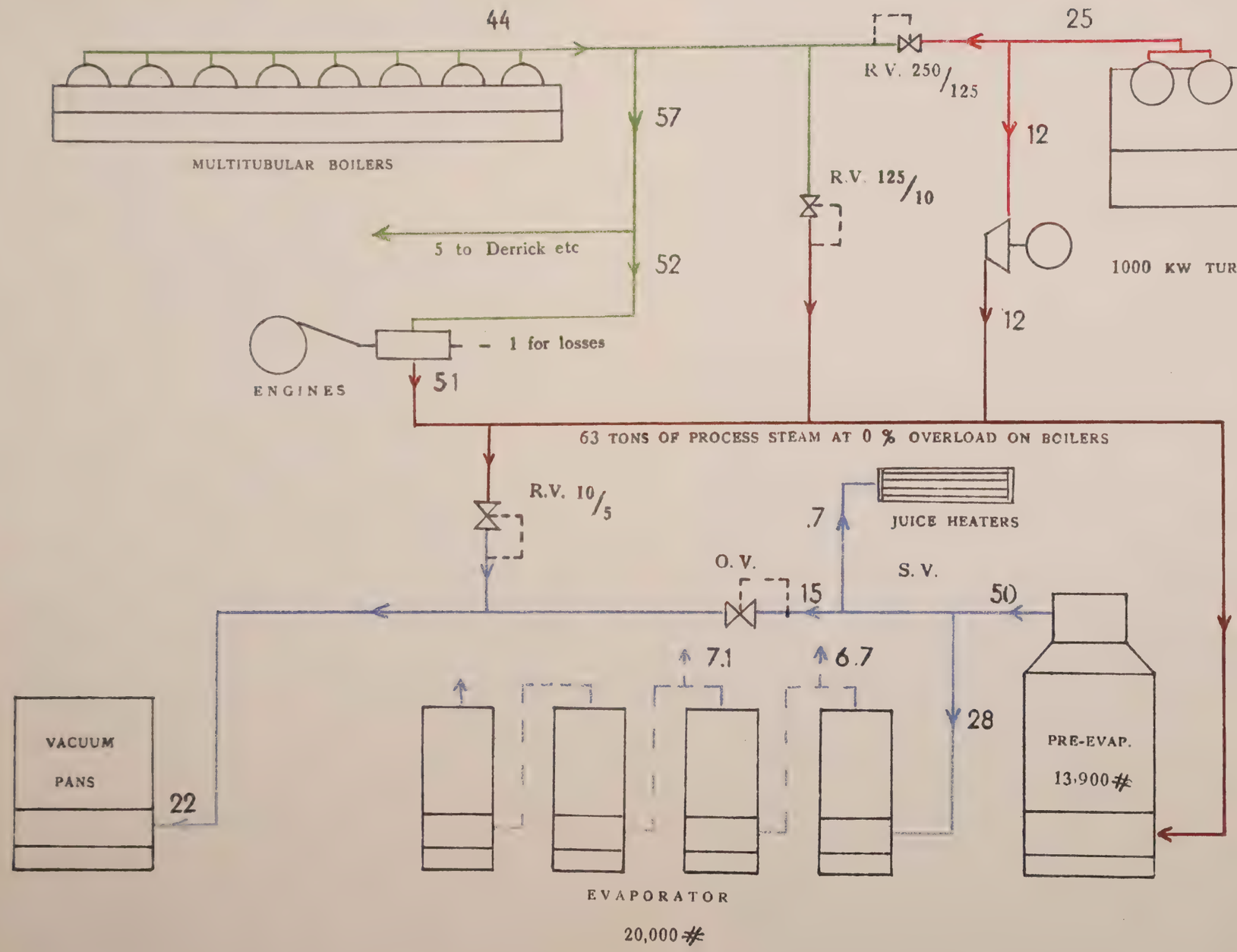

DIAGRAM OF STEAM LAYOUT

LEGEND :

R. V. = REDUCING VALVE

O. V. = OVERFLOW VALVE

S. V. = SAFETY VALVE

= PRESSURE IMPULSE

250 p. s. i. g. STEAM MAIN

125 " " "

10 " " "

5 " " "

N.B. PLAIN FIGURES REFER TO STEAM FLOW/hour in T.

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	Gravity	Refractometric	True							Gravity	Refractometric	True	
1	91.60	82.93	79.68	33.77	15.30	49.07	13.34	13.42	2.8	36.9	40.7	42.4	45.3
2	90.80	81.72	78.05	33.17	9.80	42.97	16.17	16.23	1.6	36.5	40.6	42.5	29.5
3	88.65	81.65	78.47	33.38	18.68	52.06	11.80	11.88	2.7	37.7	40.9	42.5	56.0
4	89.65	81.18	78.66	33.96	17.58	51.54	12.82	12.90	1.8	37.9	41.8	43.2	51.8
5	89.65	80.97	78.41	35.31	12.87	48.18	13.96	13.98	1.8	39.4	43.6	45.0	36.4
6	88.15	80.12	77.45	34.85	15.46	50.31	12.84	12.88	0	39.5	43.5	45.0	44.4
7	88.65	80.94	79.05	35.64	17.72	53.36	11.43	11.54	1.8	40.2	44.0	45.1	49.7
8	92.45	82.37	79.96	36.52	13.28	49.80	14.77	14.83	1.2	39,5	44.3	45.7	36.4
9	91.60	83.89	80.47	36.77	16.19	52.96	13.38	13.47	6.1	40.1	43.8	45.7	44.0
10	92.70	84.66	81.65	37.32	13.90	51.22	13.22	13.43	3.8	40.3	44.1	45.7	37.2
11	92.45	82.19	79.62	36.57	13.58	50.15	14.88	14.85	4.0	39,6	44.5	45.9	37.1
12	88.15	79.32	76.95	35.64	13.43	49.07	13.76	13.90	0	40.4	44.9	46.3	37.7
13	92.70	82.79	79.73	37.25	9.02	46.27	16.17	16.17	3.3	40.2	45.0	46.7	24.2
14	90.50	79.77	77.73	36.52	10.41	46.93	15.64	15.64	0	40.4	45.8	47.0	28.5
15	88.65	81.04	78.38	36.97	15.46	52.43	12.05	12.16	1.7	41.7	45.6	47.2	41.8
16	92.20	82.67	79.25	37.50	9.85	47.35	14.05	14.22	5.0	40,7	45.4	47.3	26.3
17	87.90	80.67	78.00	37.10	15.64	52.74	12.21	12.25	2.9	42.2	46.0	47.6	42.2
18	88.65	80.74	78.40	37.79	12.70	50.49	12.44	12.54	2.4	42.6	46.8	48.2	33.6
19	91.35	81.47	79.54	38.85	11.83	50.68	15.26	15.45	0.5	42.5	47.7	48.8	30.5
20	89.65	82.69	79.28	38.81	9.16	47.97	13.38	13.44	3.7	43.3	46.9	49.0	23.6
21	87.90	80.20	78.08	38.44	16.45	54.39	10.76	10.79	2.2	43.7	47.9	49.2	42.8
22	91.60	83.06	80.74	39.87	13.18	53.05	13.09	13.12	5.6	43.5	48.0	49.4	33.1
23	89.65	81.11	78.97	40.08	16.05	56.13	11.70	11.70	1.2	44.7	49.4	50.8	40.0
24	91.60	80.89	78.90	40.86	11.36	52.22	14.41	14.40	4,9	44.6	50.5	51.8	27.8
25	86.50	79.17	76.37	39.80	9.82	49.62	11.88	11.95	1.0	46.0	50.3	52.1	24.7
Av.	90.13	81.53	78.87	36.91	13.55	50.46	13.42	13.49	2.4	41.0	45.3	46.8	37.0

* Without any deduction.

† See : Revue Agricole de l'Ile Maurice Vol. XXII, mai-juin 1944, pp. 95-98.

DERNIÈRES NOUVEAUTÉS TECHNIQUES DANS LE DOMAINE DE LA CANNE ET DU SUCRE*

par

PIERRE HALAIS

Directeur du Laboratoire du Fonds de Réserve de l'Industrie Sucrière, Curepipe, île Maurice.

Production sucrière mondiale : La production ainsi que la consommation du sucre continuent leur ascension progressive ; la première a atteint, au cours de l'année 1951, les chiffres de 23 millions de tonnes de sucre brut en provenance de la canne et de 12,5 millions de la betterave, ce qui fait un total de 35,5 millions contre 29 millions en 1937-38. L'augmentation la plus considérable enregistrée au cours de cette même période, a été relevée à Cuba où près de 6 millions de tonnes de sucre ont été produites l'année dernière contre 3 millions avant la guerre. Il en est de même du Brésil qui, aujourd'hui, produit 1,7 millions contre 1 million précédemment. Par contre, les chutes de production les plus accusées se rencontrent à Java, 0,4 million contre 1,4 millions et à Formose 0,7 million contre 1,2 millions de tonnes de sucre brut.

Rendements culturaux record : En 1950, la compagnie sucrière d'Ewa aux Hawaï a établi une production record de sucre par unité de surface récoltée pour ce qui a trait aux grandes exploitations sucrières dans le monde. En effet, sur 4,200 acres (1,750 ha) de terrains irrigués, recoltés en cannes âgées d'environ 21 mois, le rendement moyen, ramené à l'acre récolté, s'est élevé à 12,6 tonnes de sucre brut, soit près de 31 tonnes. Toujours aux Hawaï, mais sur un champ d'essai à la Station d'Honolulu, la canne H 37 1932 a produit sur 16 parcelles expérimentales, et en vierges agées seulement de 12 mois, 70 tonnes de canne à l'acre, ce qui correspond a 0,85 tonne de sucre brut par acre et par mois ou 2,08 tonnes de sucre brut à l'hectare et par mois. Ces cannes avaient reçu une copieuse fumure azotée à la plantation et furent irriguées continuellement sauf dans la quinzaine précedant la récolte. Un concours organisé par l'association des techniciens du sucre du Deccan dans l'Inde a mis en évidence les remarquables possibilités de la variété Co 419 dans la région sucrière tropicale de Bombay. Le champ qui a remporté le premier prix a fourni 122 tonnes de cannes usinables à l'acre (300 t/ha) ayant une richesse saccharine de 11,5 %. La pièce de terrain en question était irriguée et avait reçu une très forte dose d engrais chimique azoté ainsi que

*Exposé du Président de la Société des Chimistes et des Techniciens des Industries Agricoles de Maurice à l'Assemblée Générale Annuelle du 8 février 1952.

du fumier de ferme. Ce rendement exceptionnel est, bien entendu, très supérieur au rendement cultural moyen aux Indes qui n'atteint que 14 tonnes de cannes à l'acre soit 35 à l'ha.

Expédition australienne en Nouvelle Guinée : L'année dernière a été marquée par une expédition très bien organisée en Nouvelle Guinée, ayant pour objectif la recherche de cannes indigènes susceptibles de servir au Queensland à l'amélioration par croisement. Au total 165 variétés différentes, nobles ou sauvages, furent expédiées au Queensland par avion et en plusieurs lots. Les botanistes Hughes et Buzacott qui dirigeaient l'expédition prirent toutes les précautions voulues afin d'éviter l'introduction de maladies ou d'insectes. Les boutures sélectionnées furent placées dans des sacs en caoutchouc synthétique " Pliofilm " et additionnées de poudre au D.D.T. avant d'être fermés hermetiquement. A l'arrivée à Brisbane, les boutures reçurent un traitement anti-parasitaire supplémentaire avant d'être plongées, pendant 20 minutes, dans de l'eau chaude à 52° C et contenant 150 mg de mercure par litre apporté sous une forme organique appropriée (Aretan). Parmi les cannes sauvages expédiées de Nouvelle Guinée, il en est une, la 51 NG 91, du type robustum, que l'on peut qualifier de géante et qui, en outre, offre une teneur saccharine exceptionnelle pour ce genre de canne sauvage avec un brix de 13 dans le jus. On prévoit qu'à la suite d'une ou de deux hybridations successives avec des cannes nobles, des variétés nouvelles, réunissant vigueur et richesse, pourront être sélectionnées en vue d'obtenir des cannes utilisables en grande culture. L'expédition avait pour but principal la recherche de cannes susceptibles de transmettre la maturité hâtive, qualité essentielle réclamée par l'industrie sucrière du Queensland.

Conservation des graines de cannes : Une amélioration est à enregistrer dans le mode de conservation des graines de cannes au Queensland ; on les dessèche à basse température et on les enferme ensuite dans des sacs en " Pliofilm ", ce qui permet de les garder plusieurs mois en frigidaire en vue de les faire germer au moment qui convient le mieux, selon les exigences climatiques des différents secteurs de la zone sucrière. Au Natal, on a aussi essayé de conserver, en frigo maintenu à 15°C, les graines de cannes d'une année à l'autre pour parer à un échec toujours possible dans la réussite des croisements.

Nouvelles variétes intéressantes : Parmi les obtentions nouvelles de ces dernières années, il y a lieu de faire mention des variétés suivantes qui ont, dans des essais méthodiques, révélé leur supériorité : 1) La B 41 227 qui, en Guyane britannique, aurait surclassé de 70 o/o la variété témoin ; 2) La H 37 1933 qui serait supérieure de 20 à 30 o/o aux autres cannes cultivées aux Philippines ; 3) La N : Co 310 qui se serait montrée la meilleure canne introduite à Formose en provenance du Natal ; 4) Les P. R. 962 et 1000 qui auraient produit 50 o/o de plus que la P.O.J. 2878 à Porto Rico ; 5) La C.P. 44/101, une nouvelle canne très résistante aux maladies, qui, dans les

essais, dépasse de 13 à 45 o/o les autres cannes de la Louisiane ; elle produit plus de sucre en premières repousses qu'en vierges ce qui est à l'inverse des autres cannes actuellement cultivées et 6) La E 1/37 est une canne riche qui réussit très bien en région humide à l'île Maurice.

Pré-germination des boutures en solution nutritive : A la Compagnie sucrière d Hilo aux Hawaï où, en raison du climat très humide et de l'altitude, on éprouve souvent des difficultés à faire germer les boutures de cannes à certaines périodes de l'année ; il a été tenté, avant leur mise en terre, de faire germer et enraciner artificiellement les boutures sur un lit de scories baignant dans une solution nutritive. Tous les yeux germent plus régulièrement et les jeunes plantes déjà en végétation se défendent mieux contre les mauvaises herbes.

Trempage fongicide des boutures contre la pourriture : Des recherches comparatives ont été entreprises à la Station d'Honolulu, en vue du traitement préventif des boutures contre la pourriture qui occasionne la maladie de l'ananas, pour améliorer la germination. Les meilleurs résultats furent obtenus avec l'acétate phényl mercurique (P.M.A.) qui s'est révélé aussi efficace que certains autres produits, tout en coûtant mois cher en grande culture.

Nouvel espacement entre rangées de cannes : Une méthode nouvelle de plantation a été essayée par la Station d'Honolulu ; elle s'inspire de celle couramment employée en culture de l'ananas pour faciliter les opérations culturales, la cueillette et le transport mécanique des fruits. Au lieu d'avoir des rangées espacées régulièrement à 1,50 mètres d'écartement comme à l'ordinaire, la nouvelle méthode consiste à planter deux rangées bien plus rapprochées et à laisser un espace plus large, 2,25 mètres, entre chaque double rangée. Cette disposition facilite la mise en œuvre des moyens de lutte contre les mauvaises herbes ainsi que le fonctionnement des moissonneuses mécaniques.

Mérites comparatifs des différentes formes d'engrais chimiques azotées : La Station d'Houma en Louisiane a procédé à une série d'essais comparatifs culturaux sur les engrais chimiques azotés actuellement sur le marché : sulfate d'ammoniaque, nitrate d'ammoniaque, nitrate de soude, ammoniaque anhydre et solutions ammoniacales. Il a été confirmé que la canne n'a aucune préférence pour une forme particulière d'azote assimilable et toutes choses étant égales par ailleurs, la forme la meilleure marché par unité d'azote est à recommander. En ce qui concerne les Etats-Unis, partant la Louisiane, c'est l'ammoniac anhydre, très facilement épandu à l'aide de machines adéquates, qui vient en tête, tandis que dans d'autres pays, c'est le nitrate d'ammoniaque qui semble être l'engrais azoté le plus économique en culture de la canne. Ce dernier, livré sous la forme granulée peu hygroscopique, et titrant 34 o/o d'azote, marque un progrès décisif dans le domaine de la fabrication des engrais azotés.

Fumure azotée par pulvérisation aérienne : Un mode de fertilisation tout nouveau a été expérimenté par Kerns sur les plantations de la Compagnie sucrière d'Oahu aux Hawaï en pulvérisant, d'un avion, un engrais soluble au taux d'une vingtaine de Kg d'azote par acre (50 kg N/ha). Les feuilles de cannes ainsi traitées ne tardent pas à acquérir une teinte vert foncé caractéristique. Il est à prévoir que cette fumure par voie aérienne contribuera à des économies dans les quantités d'engrais à apporter, tout en permettant de traiter la canne selon ses propres besoins et aux moments voulus. Des essais de même nature ont aussi été entrepris sur les plantations sucrières de la côte d'Hilo à l'aide d'un hélicoptère capable d'épandre l'engrais en pulvérisation aqueuse sur une quarantaine d'acres (quinzaine d'ha) en une heure de survol.

Recherches plupiologiques à l'aide d'un isotope radioactif du Phosphore : Des essais ont été poursuivis à la Station d'Honolulu sur la localisation des engrais phosphatés en retraçant la pénétration du phosphore radioactif ajouté dans la canne ; l'absorbtion de P n'est rapide que si l'engrais est apporté en profondeur et au contact direct des racines.

Laboratoire pour le " diagnostic foliaire " et le " Crop logging " : La centrale Aguire, qui est un modèle d'exploitation moderne à Porto Rico, vient de créer un laboratoire spécial pour effectuer des diagnostics foliaires en vue de la fumure rationnelle de ses champs de cannes. Deux laboratoires spécialisés, desservant un groupe important d'exploitations sucrières des Hawaï, ont été institués par Brewer et Cie, pour entreprendre des analyses chimiques de feuilles et de gaines de cannes relatives au " Crop logging " de Clements.

Dératisation des champs avec Warfarin : Doty, un des spécialistes de la station d'Honolulu, a confirmé que ce raticide sensationnel découvert aux Etats-Unis, peut être employé efficacement contre les rats qui rongent les cannes en plein champ. Les appâts à base de Warfarin (composé 42) contiennent si peu de poison actif (1 dans 4000) que les rats ne s'en méfient pas ce qui rend inutile de les attirer préalablement avec les mêmes appâts non-empoisonnés.

Nouvel herbicide au C M U : Depuis quelques mois, Hance, le chimiste en chef de la Station d'Honolulu, poursuit des essais méthodiques sur un nouveau composé herbicide dénommé C M U et découvert en 1950 par les laboratoires de recherches Dupont de Nemours ; il pourrait bien se faire que ce produit parvienne à supplanter le 2,4 D dans bien des cas. Comme C M U n'est ni une hormone, ni un poison pour l'homme et les animaux, il est susceptible d'emploi général en lisière de champs etc. Le nouveau produit arrête ou prévient la pousse des mauvaises herbes, lorsqu'il est employé en surface sur le sol nu en quantité n'excédant pas 3 Kg par acre (7,5 Kg/ha) et ses effets durent bien plus longtemps que ceux occasionnés par des doses doubles ou triples de 2,4 D. Hance procède actuellement à des essais pour tenter d'ajouter du C M U à l'herbi-

cide couvant C A D E (Emulsion concentrée et activée d'huile de diesel) de façon à obtenir avec le même mélange des effets à la fois de pré-émergence et de contact.

Diminution du fléchage par éclairage électrique nocturne : Dans les conditions culturales qui prévalent aux Hawaï, on est généralement d'opinion qu une diminution du fléchage conduit à une production sucrière accrue. C est dans ce but que la section des recherches de la Compagnie sucrière d'Ewa a mis en train un essai où certaines parcelles sont éclairées par des lampes électriques puissantes pendant une demie heure à minuit tous les soirs. Sur les parcelles ainsi éclairées, le fléchage des cannes a été insignifiant, tandis que sur celles laissées dans l'obscurité de la nuit, le fléchage demeure normal.

Accroissement de la teneur saccharine des cannes par pulvérisation au 2,4 D : Plusieurs essais ont été entrepris dans le nouveau monde, en vue d'accroître la teneur en saccharose des cannes par traitement au 2,4 D, en dose minime, pulvérisé par avion sur les feuilles quelques jours avant la récolte. Cette découverte, dont les conséquences pourraient être capitales, a été faite à Cuba par Beauchamp qui évalue la dépense à encourir à un peu moins de 4 dollars par acre (10 par ha) et estime à plus de 1 % canne l'accroissement de richesse saccharine à escompter du traitement hormonique. Par contre, deux séries d'essais analogues, entrepris en 1950/51 à Porto Rico par les spécialistes des stations sucrières officielles de Rio Predvas et de Mayaguez, ne sont pas parvenues à confirmer les prétentions de Beauchamp. D'autre part, un groupe de chercheurs brésiliens, travaillant sous le contrôle d'un comité d'experts et de représentants de l'Institut brésilien du sucre, ont enregistré, au cours de leurs essais, des accroissements moyens de 1.5 de richesse saccharine % cannes à la suite de pulvérisations au 2,4 D pratiquées quatre ou cinq jours avant la coupe des cannes. Il en ressort que la question demeure malgré tout controversable dans l'état actuel de nos connaissances.

Planteuse de cannes Mawla : Le comité de mécanisation de l'Association sud-africaine du sucre a mis au point une planteuse, la Mawla, qui s'adapte facilement à un tracteur. Le dispositif comprend des boîtes amovibles contenant des boutures préalablement sectionnées et traitées au fongicide organo mercurique ainsi qu'un épandeur d'engrais phosphopotassique.

Chargeuses de cannes à commande hydraulique : La firme Thomson de Louisiane met actuellement sur le marché une " Chargeuse Thomson améliorée " à débit très rapide entièrement équipée de dispositifs hydrauliques. Que la charge soit complète ou non, le mécanisme à commande hydraulique maintient le paquet de canne prélevé de telle sorte qu'il puisse être placé convenablement dans le wagonnet. On peut aussi employer le grappin pour opérer le tassement des cannes déjà chargées avant

de laisser le nouveau paquet. Il n'est pas nécessaire d'avoir le grappin au dessus du wagonnet de cannes et de faire tomber les cannes d'une certaine hauteur. En effet, la manœuvre du chargement mécanique d'un paquet de cannes dans le wagonnet rappelle celle du chargement manuel, car la canne peut être placée là où le désire le conducteur de la machine. Cette chargeuse Thomson permet donc de réaliser des chargements de cannes convenablement tassés.

La première présentation d'une nouvelle chargeuse " Quaid ", fonctionnant à l'avant d'un tracteur, a eu lieu à Mossuran dans le Nord du Queensland. La chargeuse a été conçue par les Quaid, père et fils, et fut construite sous les auspices du Comité de l'Industrie sucrière pour la mécanisation du moissonnage. Le tracteur utilisé est de la marque Ferguson et le dispositif de chargement du modèle Horn Draulic modifié par les inventeurs. La chargeuse est utilisable presqu'aussi bien avec des cannes relativement éparpillées qu'avec des tas bien rangés. Un wagonnet de deux tonnes de cannes peut être rempli avec sept paquets de cannes apportés du champ par la chargeuse qui arrive à enjamber les rails. Le dispositif de chargement peut être facilement enlevé de sur le tracteur pendant l'intercampagne.

Fixation des prix de cannes à Porto-Rico : Un nouveau barème est entré en vigueur pour la campagne sucrière 1951, en voici les grandes lignes : 1) Les planteurs dont les cannes possèdent un rendement sucrier de 9 o/o reçoivent l'équivalent en argent de 63 o/o de ce rendement, alors que cette proportion est portée graduellement à 67,5 o/o pour des cannes de 13 o/o ou plus de rendement sucrier ; 2) En ce qui concerne les cannes à rendement sucrier inférieur à 9 o/o, la sucrerie conserve une quantité fixe de sucre soit 3,333 kg par 100 kg de cannes usinées ; 3) Les planteurs reçoivent un boni de 66 o/o du produit net de la vente des mélasses épuisées à partir d'un chiffre de base de 5 cents par gallon (3,78 l) de mélasses.

Tandem entièrement équipé de turbines à vapeur : Fulton eut l'honneur d'inaugurer une ère nouvelle dans l'industrie sucrière en construisant le premier tandem de moulins du monde entièrement équipé de turbines à vapeur. Ce tandem, d'une capacité de 4,000 tonnes de cannes par jour, vient d'être installé à l'Usine Tamonio au Brésil. Les turbines sont du type " Worthington ".

Sulfitation par le procédé Saha : Un nouveau procédé de clarification du jus de canne par sulfitation a été inventé par Saha, directeur de l'Institut indien de Technologie sucrière à Kaupur, procédé utilisable en fabrication de sucre blanc notamment. Le jus est filtré à une forte alcalinité et à haute température. Méthode à priori condamnable par la technologie sucrière classique ; cependant, le jus clarifié obtenu est remarquable par sa limpidité, sa faible coloration et sa hausse de pureté. Le jus mélangé est chauffé à près de 70° C, puis chaulé et sulfité en même temps en employant un ou deux o/o en volume de lait de chaux à

15° Baumé. Le jus est alors chauffé jusqu'à ébullition et une dose additionnelle de chaux, à raison d'un pour cent de lait de chaux est ajoutée à ce jus neutre, puis filtré *rapidement* à travers des filtres presses. La vitesse de filtration est très satisfaisante et les tourteaux sont durs, compactes et se laissent facilement laver. Le filtrat très alcalin est *rapidement* neutralisé à l'aide de SO^2 et chauffé à nouveau jusqu'à ébullition, puis soit refiltré à travers des filtres presses ou décanté. Le jus clarifié passe directement aux appareils à évaporer. Il est prévu que des sucres d'un grade bien plus élevé seront produits et qu'une meilleure récupération sera atteinte en mettant en œuvre le procédé de sulfitation imaginé par Saha.

Procédé de clarification à l'Elguanite : La littérature technique fait aussi grand cas d'un autre procédé nouveau, la clarification à l'aide de l'Elguanite. Il s'agit d'un agent clarifiant en poudre composé de carbonates, hydroxydes, et oxydes de différents métaux, en particulier du magnésium qui, par rapport au lait de chaux, pour la défécation des jus verts de canne, augmente le rendement de 5 à 8 o/o et la polarisation du sucre jusqu'à près de 99.9, accélère les opérations et la cristallisation, tout en diminuant la formation de dépôts dans les évaporateurs. La dose d'Elguanite à employer est de l'ordre de 2 à 3 o/o des matières dissoutes contenues dans le jus vert. Le procédé est d'origine américaine ; il a fait l'objet de commentaires très optimistes par Hund dans la revue " Sugar News " publiée aux Philippines.

Signalisateur continu de sucre dans les eaux d'alimentation des chaudières : Powers & Death ont mis au point un dispositif continu qui permet de signaler le sucre dans les eaux servant à alimenter les chaudières des sucreries. L'appareil inédit qui a fonctionné convenablement au cours des deux dernières années, utilise la réaction bien connue de l'α-naphtol pour laquelle une coloration violette est provoquée par la formation de produits de condensation entre l'α-naphtol et les produits de décomposition du sucre en milieu sulfurique.

Bilan des pertes en sucrerie d'après les chlorures : Zauni (Pérou) tente de déterminer les pertes en saccharose, produites au cours de la concentration du jus, en faisant le bilan des chlorures à l'aide de dosages méthodiques. Il fait appel à la méthode de titrage électrométrique imaginée par Best, à l'Institut Waite d'Adélaïde, et qui utilise une solution étalon de nitrate d'argent. Le point final du titrage est particulièrement net, ce qui assure une précision et une rapidité suffisantes en pratique industrielle. Selon Best lui-même, une centaine de dosages peut être effectuée en une journée.

Contrôle chimique basé sur le saccharose : Selon Jundu Rao et Kulkarui il est possible de conduire le contrôle chimique de sucrerie en se basant exclusivement sur des données se rapportant au saccharose, à condition de réduire le nombre d'échantillons à analyser et de simplifier le dosage du

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saccharose. Les essais ont prouvé que l'addition de 0,5g de bichlorure de mercure par litre de jus, pratiquée conjointement avec la réfrigération permet de garder les jus inaltérés pendant au moins 27 heures, ce qui fait que l'on peut sans aucun risque se contenter d'une détermination unique de saccharose par équipe. Comme les mélasses et les sucres ne réclament aucun soin pour les conserver, le nombre d'analyses sur ces produits peut être réduit à un par jour, s'ils sont convenablement échantillonnés et mélangés. La méthode chimique de détermination de saccharose, comportant le dosage des sucres réducteurs, selon Lane et Eynon, pratiqué avant et après inversion et qui est actuellement à l'étude par la commission internationale pour l'unification des méthodes d'analyses sucrières, permettra sans doute de résoudre le problème, car les autres procédés existants à l'heure actuelle, tels que la méthode IV de Jackson et Gillis ou la méthode normale à l'invertase, possèdent toutes deux des désavantages inhérents.

Nitrate de plomb basique sec comme déféquant : Solano (Pérou) a mis en avant la supériorité du nitrate de plomb basique sec par comparaison à l'acétate de Horne pour déféquer les solutions sucrées contenant des substances à activité optique élevée telles que le dextran.

Analyse rapide du sucre total dans les mélasses de canne : Une méthode rapide de dosage du sucre total dans les mélasses de sucre de canne avec une précision de 1 à 2 % a été présentée par Zabluisky. On détermine les cendres par conductimétrie la teneur en eau par lecture au réfractomètre et les non-sucres organiques sont obtenus par multiplication de la teneur en cendres par un facteur approprié, déterminé expérimentalement. La somme de ces trois subtances (cendres, eau et non-sucres organiques) déduite de 100 donne la teneur en sucre total.

Dosage volumétrique de Ca et Mg dans le jus : Saunier et Lemaitre ont mis au point un procédé récent de dosage de Ca et Mg dans le jus de sucrerie pouvant être très utile, d'autant plus qu'il est à la fois rapide et précis. La méthode est basée sur le fait que le sel sodique de l'acide éthylène-diamine tétraacétique a la propriété de se combiner aux ions Ca et Mg pour former des composés solubles très peu dissociés. Par addition progressive de versenate aux solutions, le calcium se combine d'abord, puis la magnésie. Des indicateurs de fin de réaction permettent de réaliser le titrage volumétrique de l'ensemble de Ca + Mg d'une part et de Ca d'autre part.

Réfractomètre à main 0-85 de Zeiss-Opton : Un nouveau réfractomètre à sucre à main vient de sortir des usines allemandes : il s'avère très pratique. Le modèle, récemment conçu, présente un instrument de mesure qui, dans son domaine de concentration de 0 à 85 o/o de matières sèches, permet d'associer au maniement aisé des anciens réfractomètres à main, l'exactitude des plus grands modèles. Dans la partie inférieure de la mon-

ture métallique du prisme de mesure est encastré un thermomètre de 10 à 40 °C pour exécuter les corrections de température. Il est parfaitement possible de lire la matière sèche à 0.1 ou 0.2 o/o près, même avec des mélasses diluées à moins de 1 : 1, précision largement suffisante pour le contrôle industriel des sucreries.

Sucre de la bagasse par digestion rapide à froid : Bliss a préconisé l'utilisation des mélangeurs électriques ménagers (mixers) tournant à quelques 15,000 tours minute comme les appareils Turmix, Warnig Blendor etc. pour arriver à rompre complètement toutes les cellules de la bagasse en vue d'une digestion rapide à froid comme prélude à la détermination de la teneur en sucre de la bagasse de canne. Une firme anglaise a présenté récemment le mélangeur Magimix pour le même usage.

Expédition du sucre en vrac : Ce mode d'expédition commence à se généraliser et Tate & Lyle est actuellement équipé pour recevoir 800,000 tonnes de sucre en vrac, chiffre qui sera porté ultérieurement à 1,750,000 tonnes. Une nouvelle compagnie la " Sugar Line " a été formée pour construire des bateaux spécialement agencés pour le transport du sucre en vrac vers l'Angleterre. En novembre dernier, le premier envoi australien a été effectué, il porte sur une cargaison de quelques 10,000 tonnes de sucre brut à destination du Royaume-Uni. La longueur du trajet Mackay-Londres va contribuer à fournir d'utiles renseignements à ce sujet.

La mélasse matière première du caoutchouc synthétique : Les mélasses jouent actuellement un rôle très important dans les projets de défense militaire des Etats-Unis. On estime, pour 1951 seulement, que pas moins de 5 millions d'hectolitres de mélasses auront permis aux américains de continuer à rouler sur des pneus. La mélasse est une source d'alcool éthylique et ce dernier est le composé de base pour la fabrication du caoutchouc synthétique.

Prévention des dépôts dans les cloonnes à distiller : Les dépôts dans les colonnes à distiller les moûts de mélasses occasionnent souvent de graves ennuis : Kloppenburg (Indes) croit devoir attirer l'attention des distillateurs sur une technique qui empêche les dépôts de se former. Selon lui, le mal provient du fait que la température du moût sur le plateau d'alimentation est généralement trop basse, ce qui rend possible des concentrations en alcool de l'ordre de 15 o/o. Les sels qui étaient solubles en présence d'une teneur de 7 à 8 o/o d'alcool dans le moût, deviennent de ce fait insolubles et il s'ensuit un début de précipitation et de cristallisation qui provoquent l'encrassement de la colonne. Kloppenburg s'arrange pour élever, à l aide de dispositifs appropriés, à 92°C la température du moût à l'entrée ainsi que celle du liquide sur le plateau d'arrivée, de manière à éviter l'accumulation dangereuse de l'alcool à ce point critique de l'appareil à distiller. Des distilleries qui avaient pour habitude d'interrompre leur marche tous les quatre jours environ, sont actuellement en mesure de fonctionner sans interruption pendant plus de six mois.

Procédé Merz d'extraction de la cire de canne des tourteaux : Le procédé inventé par Merz a vivement attiré l'attention. Les tourteaux secs sont d'abord traités à froid par de l'éther de pétrole, afin de dissoudre la majeure partie des matières grasses, puis la cire dure recherchée est extraite en élevant la température du même dissolvant près de son point d'ébullition.

Tourteaux de filtres presses comme engrais organique : Les tourteaux constituent un engrais de premier ordre pour les jardins notamment. Jusqu'à tout dernièrement on n'avait pas réussi à les débarrasser des cires qui entravent leur décomposition et qui enlevaient beaucoup de leur valeur fertilisante. Owen, par un procédé bréveté, extrait d'abord la cire des tourteaux, puis inocule le résidu avec la quantité voulue de microflore du sol, traite avec de petites quantités de sulfure de carbone, dessèche et façonne le tout de manière a être facilement transporté. En fin de compte, les tourteaux ainsi traités provoquent une croissance plus rapide des plantes que dans le cas où l'on opère avec un produit brut. La masse fertilisante contient 30 o/o de matières organiques dont 6 o/o de protéines ainsi que 9 o/o de phosphate tricalcique.

Utilisations industrielles de la bagasse : Cette matière première est en train d'acquérir une importance nouvelle, d'autant plus que certaines sucreries en possèdent un surplus qui ne trouve aucun emploi intéressant. Les spécialistes des industries chimiques en Louisiane et aux Hawaï sont parvenus à séparer la fibre proprement dite — matière d'un bon emploi pour la confection de papier à imprimerie, de la bourre — utilisable pour absorber de la mélasse et des levures en vue de produire un aliment synthétique de valeur pour les animaux. La bagasse entière ne peut servir qu'à la fabrication des panneaux d'agglomérés genre Celotex; elle est par contre inutilisable directement dans l industrie du papier à moins que l'on en retire la bourre. La tonne de fibre. ainsi préparée à partir d un poids triple de bagasse humide, vaut actuellement environ 15 dollars.

Enseignement supérieur de la technologie sucrière : L'Université de Brisbane vient d'instituer un enseignement supérieur consacré à la technologie du sucre de canne et dont le programme d'étude ne le cède en rien à ceux en vigueur dans d'autres grands pays. Les candidats éventuels doivent détenir une licence universitaire portant sur quatre années d'études consacrées aux sciences appliquées en général ou à la chimie industrielle. Les études spécialisées relatives à la technologie sucrière ne doivent s'étendre que sur une année universitaire. Un stage d'un mois sur une sucrerie en marche est aussi prévu.

Instituts de Recherches : Plusieurs Instituts ont été réorganisés ou ont connu le jour au cours de l'année écoulée : 1) Le Bureau des Stations expérimentales sucrières du Queensland a acquis une quasi-autonomie : il est actuellement dirigé par un Comité à pouvoirs étendus en

matière de fixation des salaires entre autres ; il est composé de quatre membres seulement, le ministre de l'agriculture comme président, le sous secrétaire d'état à l'agriculture, un représentant nommé par l'association australienne des producteurs de sucre et un représentant nommé par l'association queenslandaise des planteurs de cannes ; 2) La création d'un Institut de recherches à Mackay pour le compte de " Sugar Research Ltd ", association volontaire des usiniers dans le but spécifique d'entreprendre des recherches sur les questions sucrières dans leur ensemble ; 3) La création d'un Institut de recherches sur la fabrication du sucre au Collège Howard à Durban, lui même affilié à l'Université du Natal. L'Institut en question et dont la construction coûtera quelques £ 30,000 sera appelé à fonctionner en coordination avec le Conseil sud-africain pour les recherches scientifiques et industrielles. Les frais généraux seront partagés moitié par le Conseil, moitié par l'Association sud-africaine du sucre ; 4) Le ministère de l'Alimentation et de l'Agriculture de l'Union indienne vient d'inaugurer à Lucknow les travaux de construction des bâtiments devant abriter l'Institut indien de recherches sucrières et où seront transférés plus tard les services de l'ancien Institut de technologie sucrière qui fonctionne encore à Kampur. Les bâtiments de l'Institut vont coûter quelques 7 millions de roupies soit £ 500,000 ; 5) La Station d'amélioration de la canne à Coimbatore, qui jouit d'une réputation mondiale pour les services qu'elle a déjà rendus va être transformée en un véritable Institut de recherches sur la canne et sera désormais placée sous le contrôle direct du Ministère de l'Alimentation et de l'Agriculture de l'Union indienne ; 6) Un grand Institut philippin du sucre vient d'être instauré ayant comme tâche principale la poursuite de recherches relatives à l'industrie sucrière sous tous ses aspects. L'Institut sera placé sous l'égide de l'Administrateur de la Coordination Economique. Il comprendra une Station Centrale d'expérimentation et plusieurs Stations régionales.

Congrès et conférences techniques : La plupart des associations nationales de technologie sucrière qui fonctionnent activement dans presque tous les pays gros producteurs de sucre de canne ont réunis leurs membres en Congrès au cours de 1951 comme elles le font chaque année pour entendre des communications sur les progrès de l'agronomie de la canne, la fabrication du sucre, la mécanique des usines, l'utilisation des sous-produits, etc. L'association des techniciens de sucrerie de Cuba qui compte actuellement plus de 1,800 membres a fêté son 25ème anniversaire en novembre 1951 avec un éclat particulier : 1,200 membres ou invités étrangers de marque étaient présents et une cinquantaine de communications d'intérêt technique ou scientifique furent entendues. Une importante réunion a groupé pour la première fois la majorité des spécialistes des recherches sur la canne à sucre que compte l'Union indienne.

Publications importantes : En ce qui concerne les comptes, ouvrages ou publications nouvellement parus traitant de la production du sucre de canne, il convient de citer tout particulièrement : 1) " Proceedings of the

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Seventh Congress of the International Society of Sugar Cane Technologists " tenu à Brisbane en 1950 ; 2) " La sucrerie de cannes " ouvrage très complet écrit par Emile Hugot, ingénieur et industriel à l'île de la Réunion ; 3) " Combatore Canes in Cultivation " par Dutt et Rao ; et 4) " The Industrial utilization of sugar cane by-Products " par Walter Scott, étude publiée à Port of Spain, île de la Trinité, par la Commission des Caraïbes constituée de membres nommés par les Etats-Unis, le Royaume-Uni, la France et la Hollande.

Bibliographie : De larges emprunts ont été faits aux grandes revues sucrières pour la rédaction de cet exposé qui, autant que possible, couvre les actualités techniques relatives au sucre de canne pour l'anné 1951 : *The International Sugar Journal, Sugar Industry Abstracts, Sugar, The Sugar Journal, The Sugar Bulletin, The Australian Sugar Journal, The Producers Review* (Queensland), *The South African Sugar Journal, Indian Sugar, Hawaiian Planters Record, La Revue Agricole de l'île Maurice, Industries Agricoles et Alimentaires, Sucrerie Française, Chimie et Industrie* et *La Sucrerie Belge.*

SUGARCANE RESEARCH IN MAURITIUS DURING 1950*

Introduction

After four years of continuous records, the sugar crop has cultivated in the present season total of nearly 457,000 metric tons. The progressive upward turn of production after the 1944 and 1945 cyclone years has been of incommensurable benefit to the Colony, and there are good prospects of the 1951 crop carrying the curve still higher.

Good growing weather has prevailed on the whole, and the Colony was again fortunate this year in not suffering damage from tropical cyclones. The cane growth season started in december 1949 during a drought which had already been prevailing for four months. In the middle of January, a cyclone which passed 100 miles West of Mauritius, produced beneficial rains which brought up the rainfall of that month to normal. Precipitations were deficient in the North and West in February, but very plentiful all over the island in March.

The credit for the high cane yields per arpent in 1950 cannot be entirely given to the favourable season experienced. The varietal component is undoubtedly of the utmost importance, and should not be overlooked or underestimated.

The cold and protracted winter was, on the whole, favourable to cane maturing, and the average sugar extraction worked out to 12.27, as against 12.4 the previous year.

PART I — CANE BREEDING DIVISION

Cane Breeding — M./50 Series

Climatic conditions were, on the whole, unfavourable for hybridization and seed setting in 1950. There was a scarcity of arrows in the breeding plots, particularly at Pamplemousses, where the crossing programme had to be curtailed considerably.

Crossing was carried out at Réduit and Pamplemousses during the period May — August.

The cross-pollination work involved more or less the same parental varieties as in 1949. No new varieties could be utilised due to the fact that the canes recently imported from overseas are still undergoing quarantine in the glasshouse at Réduit.

Promising crosses have had to be replicated to provide large hybrid

* Being a summary of the twenty-first annual Report of the Sugarcane Research Station, Govt. Press, pp. 1-32.

seedling populations at Réduit, Hermitage and Pamplemousses. The Barbados varieties B. 34104, B. 37161, B. 37172 and B. 3439 appeared in a certain number of matings, but could not be used as extensively as the previous year due to shortage of arrows. They, in general, proved less prolific than in 1949. The variety E. 1/37 occurred in many crosses, the main object in using this variety being to try to produce seedling canes adapted to the poor leached soils of the superhumid areas of the Colony. Crosses of the fourth nobilized glagah type could not be made as contemplated due to paucity of arrows.

Fuzz fertility was, on the whole, lower than normal. A large number of crosses produced very few or no seedlings at all, particularly towards the beginning and end of the crossing season.

The seedlings in the greenhouse at Réduit made slow growth due to the cold and protracted winter and, as a result, transplanting to pots was considerably delayed. This suggest that the greenhouse should be heated at night during abnormally cold winters, the more so that fuzz germination is undoubtedly adversely affected by low temperatures.

Damping-off disease occurred to a certain extent at Réduit despite a careful control of waterings, and many seedlings were lost. The disease was not in evidence at Pamplemousses. At Réduit the mixture of soil and pen manure for planting the fuzz had to be heated on tin sheets instead of being steam-sterilized as customary, the sterilizer being out of order.

The table below shows the extent of the breeding work, the number of seedlings raised and the number planted in the field :—

Nature of Cross	*Number of crosses made*	*Number of seedlings obtained*	*Number of seedlings planted in the field*		
			C.E.S.	*P.E.S.*	*H.E.S.*
1. Between noble canes	1	8	7	—	—
2. 2nd Nobilized *S. spontaneum*	1	4	—	—	—
3. 3rd Nobilized *S. spontaneum*	2	54	54	—	—
4. 4th Nobilized *S. spontaneum*	12	866	695	—	—
5. 5th Nobilized *S. spontaneum*	13	112	102	—	40
6. Mixed *S. spontaneum* crosses	118	19,957	4,606	6,000	7,118
7. Crosses involving several *Saccharum* species	38	2,164	513	962	16
TOTAL	185	23,165	5,977	6,962	7,174

Total number of seedlings planted in the field : 20,113

Seedling raised at Réduit were sent in the box stage to Hermitage and Pamplemousses for potting out. All seedlings obtained at Pamplemousses were planted in the field at that Station, and none sent to Réduit or Hermitage. A few thousand seedlings potted at Réduit were transported to Hermitage in a Station Waggon.

Experiments conducted at the Central Experiment Station, Réduit, for the past two years, have shown conclusively that seedlings can be transplanted to pots direct on the concrete beds in the nursery, instead of transplanting in the greenhouse and transferring to the nursery after 7 to 10 days. For that purpose, half of the seedlings from several crosses was potted out in the greenhouse as usual, and half direct on the beds. There was no apparent difference in the growth of the seedlings whether in the greenhouse or nursery, and the percentage of seedlings which died off after potting was about the same. Potting seedlings in the nursery instead of in the greenhouse is not only labour saving, but also avoids congestion in the latter, a factor of some importance when one and the same glasshouse is being used for raising seedling in pans and in pots.

A small glasshouse to accomodate about 3,000 potted seedlings was erected by the Public Works Department at Hermitage following the recommendations made the previous year. Seedlings were transplanted to pots in this glasshouse and then transferred to the stone beds in the nursery when 5 to 6 inches high. The last batches potted out were left in the glasshouse until ready for transplanting in the field. It is needless to stress that these seedlings made excellent growth and looked very healthy at the time of transplanting.

It is also interesting to record that mortality in the nursery was very greatly reduced by transplanting to pots in the glasshouse first. The spectacular losses of the previous year, due to potting direct in the nursery, were reduced to insignificant figures, and thus larger numbers of seedlings could be planted in the field in the case of certain crosses.

Variety Trials

1. *Trials laid down.* Only 9 variety trials have been planted during the year, in view of the large number of trials already in existence. The varieties occuring in these experiments are : new seedling canes bred by the Sugarcane Research Station, the most promising of the six Barbados varieties and E. 1/37. The variety E. 26/42 being susceptible to Red Rot was not included in these trials.

The variety M. 11/43, which gave out standing results in ratoon in a third trial at Pamplemousses, was planted in two variety trials in the North of the Island. One of these trials has been laid down on an estate with irrigation, and the other in a very dry locality where no irrigation water is available. The latter trial also includes E. 1/37 whose performance under dry conditions is being investigated.

Field observations made in November, i.e., during a dry spell, showed that M. 11/43 appears susceptible to drought, but not to the same extent as E. 1/37. They add support to the view held so far that the latter variety appears unsuitable for cultivation in the dry areas of Mauritius.

A trial containing E. 1/37, B. 34104, B. 37161, M. 134/32 and B.H. 10/12 (as standard) was planted at Mon Désir S. E. in the district of Black

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River. This estate is the only stronghold of B.H. 10/12 in the Colony at present ; on all other estates of the same district and of other districts, this variety has been giving progressively lower yields and has been completely ousted by M. 134/32. Abundance of irrigation water may be one of the reasons why it has maintained its supremacy at Mon Désir. It will be interesting to find whether any serious competitor with B. H. 10/12 can be sorted out from the newly planted variety trial.

In pursuance of the breeding policy regarding the production of special types of canes for the poor leached soils of the uplands, seedling canes having given good accounts of themselves in preliminary tests at Hermitage Experimental Station, have been planted in trials at Alma and in rainy parts of Britannia and St. Aubin S. E., E. 1/37 and M. 134/32 appearing as standards.

Trials harvested. Fifty one variety trials have been harvested during the crop season, 13 in plant cane and 38 in ratoons (first to third, as compared with a total of 44 the previous year.)

The reaping of these trials took place as scheduled and without inconveniences due to the cooperation of estates' managers. Three trials were cut, without the plots' yields being recorded by the estate themselves through an oversight. The use of addiators for recording plot yields facilitated the work of the officers engaged in reaping the trials.

Growth and maturation conditions having been satisfactory on the whole, cane yields have generally been running high and good juice qualities have been met with. The favourable weather conditions have probably enhanced the performance of the seedling canes under trial.

The yield data collected during the year under consideration are more valuable than those obtained in 1949 due to the higher proportion of ratoons reaped. At the request of the Sugarcane Research Station Advisory Committee, some of the trials containing released varieties have been harvested in third ratoon, and may be continued in fourth and possibly fifth ratoons, so that a concrete knowledge of the ratooning power of these canes may be obtained prior to their being propagated on a large scale on sugar estates.

Variety trials harvested are detailed under six sub-sections as per the following :—

(*a*) *M. 213/40 and M. 423/41.* The results obtained with M. 213/40, in comparison with M. 134/32, in a large number of tests in plant cane and ratoons, covering six years, are summarized hereunder :—

Variety		*Virgins* (*mean of* 31 *trials*)	*1st Ratoon* (*mean of* 27 *trials*)	*2nd Ratoon* (*mean of* 13 *trials*)	*3rd Ratoon* (*mean of* 5 *trials*)	*Average* (*mean of* 76 *tests*)
Tons cane per arpent	M. 213/40 ...	43.3	41.3	42.8	46.7	42.7
	M. 134/32 ...	34.9	34.4	34.8	36.0	34.8
	Difference ...	+ 8.4	+ 6.9	+ 8.0	+ 10.7	+ 7.9
	Per cent ...	24.0	20.0	22.9	29.7	22.7

Variety		Virgins (mean of 31 trials)	1st Ratoon (mean of 27 trials)	2nd Ratoon (mean of 13 trials)	3rd Ratoon (mean of 5 trials)	Average (mean of 76 tests)
Juice Purity per cent	M. 213/40	80.7	84.2	84.9	86.7	83.0
	M. 134/32	83.6	86.5	87.0	87.5	85.5
	Difference	— 2.9	— 2.3	— 2.1	— 0.8	— 2.5
C.C.S. per cent cane	M. 213/40	11.8	12.8	13.1	13.1	12.4
	M. 134/32	12.6	13.3	13.6	13.0	13.0
	Difference	— 0.8	— 0.5	— 0.5	— 0.1	— 0.6
Tons C.C.S. per arpent	M. 213/40	5.07	5.30	5.60	6.11	5.31
	M. 134/32	4.52	4.61	4.73	4.69	4.60
	Difference	+ 0.55	+ 0.69	+ 0.87	+ 1.42	+ 0.71
	Per cent	12.10	14.90	18.30	30.20	15.40

Canes from nine propagation plots of M. 213/40 were bulked for factory crusher juice analysis under the supervision of the Sugar Technology Division of the Department of Agriculture. M. 134/32 canes of the same category, and growing under as similar conditions as possible, were also analysed for comparison purposes. The canes crushed comprise both virgins and ratoons. The results of the milling tests are the following :—

	M. 213/40	M. 134/32	Difference
Juice Purity %	84.8	88.3	— 3.5
Fibre % cane	10.95	12.25	— 1.30
C.C.S. % cane	12.25	12.87	— 0.62

In two of these tests, M. 213/40 gave much lower juice purities than M. 134/32. In one case, the low figure obtained is probably due to the fact that the canes crushed were young immature virgins.

The average juice purity of samples collected from variety trials, distributed in space and time, is probably more reliable than the factory tests results due to the high number of samples analysed (76) and to a better comparison between the samples of M. 213/40 and those of the standard variety.

Considering all the results obtained with M. 213/40 so far, the following conclusions may be drawn regarding its performance :—

(*a*) It has considerably surpassed M. 134/32 in yield of cane and sugar in plant cane and ratoons.

(*b*) It has, on the whole, poorer juice qualities than M. 134/32.

All the results obtained up to the end of 1950 will be submitted for scrutiny by the Cane Release Committee.

Cases of " stem deterioration " have been noticed on M. 213/40 in three variety trials, and healthy and diseased cane samples taken and analysed at the request of the Plant Pathologist of the Department of Agriculture. The data obtained are two fragmentary for one to arrive at definite conclusions regarding the final effects of the disease, but it would appear that it results in lower juice purities.

Healthy and diseased portions of the stalks were also sampled and analysed separately. The differences in juice purity and C.C.S. were more pronounced than for whole canes, but it is considered that the figures obtained are of little significance, as the diseased portions accounted for a small percentage of the stalks, and were therefore of little value in assessing the magnitude of the damage due to tissue necrosis.

It would appear that there is a certain connection between arrowing and stem deterioration in that particular variety. Arrowed and non-arrowed canes were split transversely and examined. All the arrowed canes showed symptoms of necrosis, but the great majority of the non-arrowed canes was disease free. In the arrowed canes, the degree of necrosis was higher at the top than at the bottom of the canes, a fact which may show a certain relationship between the disease and arrowing.

***

M. 423/41 having been released during the 1950 crop, only the results obtained in variety trials in second and third ratoons will be given. These are as follows :—

	Varieties	*Second Ratoon (mean of 5 trials)*	*Third Ratoon (mean of 2 trials)*
Tons cane per arpent	M. 423/41	34.79	35.81
	M. 134/32	31.17	34.27
	Difference	+ 3.62	+ 1.54
Juice Purity %	M. 423/41	86.40	83.20
	M. 134/32	88.10	85.20
	Difference	— 1.70	— 2.00
C.C.S % cane	M. 423/41	13.70	12.40
	M. 134/32	14.50	12.80
	Difference	— 0.80	— 0.40
Tons C.C.S. per arpent	M. 423/41	4.79	4.04
	M. 134/32	4.63	4.39
	Difference	+ 0.26	— 0.35

The above figures tend to show that M. 423/41 ratoons as well as M. 134/32, but that its juice qualities were, in these trials, not as good as those of M. 134/32. The study of the performance of this variety in older ratoons will be pursued.

No factory tests on M. 423/41 were made during the past crop.

(*b*) *Barbados Varieties.* A large number of trials including these varieties has been reaped in 1950, three of which were in second ratoon and the remainder in virgin and first ratoon.

The following conclusions may be drawn regarding the performance of the Barbados varieties in first ratoon. B. 3337 is the only variety having beaten, by a certain margin, M. 134/32 in yield of cane and sugar. It appears to crop well even in the superhumid zones of the Island,

and it will be interesting to study its performance in comparison with E. 1/37 in the uplands. It has, so far done very well at Sans Souci and Union Park which have high rainfall. B. 34101 yields well in first ratoon, has good juice and is probably one of the best of the B canes for all round purposes; it appears resistant to drought. B. 37101 gave much better yields in plant cane than in first ratoon due perhaps to the fact that it tillers badly. It is a very fast grower and may yield progeny of value when mated with some of the Mauritian varieties. B. 37172 has given satisfactory results in many tests, but there is nothing particular to mention about it. B. 9018 and B. 343[illegible] are unsuitable to our conditions, particularly the latter which is exceedingly poor under the varying conditions of the tests.

c) E. 1/37. This variety is being studied in view of its probable release for commercial growing. The average results obtained in virgin and first ratoon in variety trials, under a diversity of environmental conditions, are summarized below:—

	Varieties	*Virgins (mean of 10 tests)*	*1st Ratoon (mean of 7 tests)*	*Average (mean of 17 tests)*
Tons cane per arpent	E. 1/37	31.75	32.87	32.19
	M. 134/32	31.14	31.64	31.34
	Difference	+ 0.61	+ 1.23	+ 0.85
Juice Purity per cent	E. 1/37	87.30	89.70	88.20
	M. 134/32	86.10	88.40	87.00
	Difference	+ 1.20	+ 1.30	+ 1.20
C.C.S. per cent cane	E. 1/37	13.50	14.20	13.80
	M. 134/32	13.20	13.80	13.40
	Difference	+ 0.30	+ 0.40	+ 0.40
C.C.S. per arpent	E. 1/37	4.40	4.60	4.48
	M. 134/32	4.17	4.38	4.25
	Difference	+ 0.23	+ 0.22	+ 0.23

Milling tests made on virgin and ratoon canes at Highlands S. E. in co-operation with the Central Board of the Department of Agriculture, are the following:—

	E. 1/37	*M.* 134/32	*Difference*
Juice Purity per cent	91.9	90.0	+ 1.9
Fibre per cent cane	11.09	10.44	+ 0.65
C.C.S. per cent cane	14.02	13.43	+ 0.59

There is fairly good agreement between the average juice purity of samples from variety trials and that of the milling test, and the figures show that the juice purity and sucrose content of E. 1/37 compare very favourably with those of M. 134/32.

E. 1/37 appears particularly suited to the higher rainfall localities of the Colony, but in the drier localities the results of several variety trials tend to show that, although it yields less than M. 134/32, its sugar output per arpent approaches that of M. 134/32 due to its higher *richesse*. Under

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irrigation at Médine S. E. it has been beaten by M. 134/32 in plant cane and first ratoon.

Release of M. 423/41

The variety M. 423/41 was released for general distribution during the year under review, and there were heavy demands for planting material from planters and millers. The distribution commenced in August and covered the whole crop period. Canes cut from propagation plots on the larger estates, and at Richelieu, Réduit, Hermitage and Pamplemousses Experimental Stations, and from variety trials, were used for distribution. A total of over 185,000 canes had been supplied to applicants all over the Island by the end of the year.

Other Investigations

Aretan as a Preservative for Male Arrows. Investigations on the use of Aretan solutions, at varying concentrations, as a preservative for male arrows, were carried out on a small scale, with promising results. Arrows of P.O.J. 2878, D. 109 and M. 99/34, cut with three to four feet of stalk, were allowed to stand in Aretan solutions of concentrations ranging from 0.10 per cent to 0.03 per cent, 0.03 % SO_2 solution being used as control. Nodes were cut on every second day as is usually practised for male arrows required for breeding purposes.

Daily observations revealed no appreciable differences in the pollen shedding and longevity of the arrows kept in Aretan solution as compared with those kept in ordinary SO_2 solution. Pairs of crosses were therefore attempted with the male arrows dipping in Aretan and SO_2 solutions respectively, with satisfactory results. There were no indications of the fuzz fertility having been impaired by the Aretan ; there was also no difference in the growth of the seedlings derived from crosses made with the male arrows in Aretan and SO_2.

These investigations which have been made at the suggestion of the Senior Field Demonstrator, will be repeated on a wider scale next year and will be made to comprise a large number of male parent varieties.

Effect of Source of Planting Material on Cane Yield. The three 5 × 5 Latin squares laid down at Réduit, Hermitage and Pamplemousses to determine whether yield of cane and sucrose can be correlated with the source of planting material of M. 134/32, were harvested. Brix samples were taken with the Zeiss hand refractometer.

The cuttings from Hermitage gave significantly lower yields of cane at Réduit and Hermitage. At Pamplemousses, the cuttings from Hermitage also produced the lowest yield of cane, but the differences in yield from the other sources did not reach significance at the $P = 0.05$ level, due probably to a higher experimental error.

The cuttings from St. Antoine S. E. germinated well and gave rise

to good cane yields despite the fact that they were badly infested with borers.

The lowest cane yields produced by the planting material from Hermitage may be ascribed to a lower plant food content of the cuttings, the locality being notable for mineral soil deficiencies, which may be reflected in the cuttings.

There was no statistical difference between any of the sources as regards the percentage of total solids in the juice.

The Latin Squares are being continued in first ratoon to see whether there is any repetition of the plant canes' results.

Imported Varieties

The following varieties have been introduced from Canal Point, U.S A., and planted in the quarantine greenhouse at Réduit: C.P. 34-120 C.P. 36-13, C.P. 36-105, M. 336, M.L. 3-18 and P.R. 905. The cuttings of C.P. 34-120 were destroyed after reception, as this variety had previously been introduced from South Africa. The C.P. canes were re-exported to Mauritius by the Canal Point authorities on their being informed that the previous consignment had to be destroyed.

The second generation of C.P. 34-120, Co. 419 and Co. 421, received from South Africa towards the end of 1949, was established in the greenhouse.

Fertilizer Trials on Estates

The number of $3N \times 3P \times 3K$ factorial experiments under the control of this Division amounted to sixteen, but the results of only thirteen trials are presented in this report.

The response to Nitrogen fertilization was very high, amounting to almost 10 tons of cane per arpent, or a 52 per cent increase on the control.

Average responses to Phosphate and Potash are small (and almost negligible) for the series, thus indicating the very high status of estate soils in these elements, especially when it is considered that they have been withheld from the controls for five consecutive years.

If the results of the 5 crops are considered with a view to determining the effect which climate and soil type may bear on the response to fertilizers, the following may be deduced :—

First, the response to Nitrogen could not be correlated to either climate or soil type, as all types need this fertilizer.

The response to Potash, though small, seems general, but is lower in dry areas and higher in more humid areas. In 75 per cent of the cases, there is a positive but small response to Potash.

As far as Phosphate is concerned, except for the gravelly soils of the more humid regions where a constant response to this fertilizer is

observed, most of the sugarcane soils seem to have a rather good supply of that element.

The response of our soils to Phosphate fertilization does not seem to be governed by climatic conditions, but depends solely on the previous fertilization which the soil received. Experimentation shows one positive but small response to phosphate in 30 per cent of the tests.

Use of Pen Manure

All the available and relevant data concerning the effect of pen manure were collected from the experiments under the control of this Division and the following figures, which are of a certain interest, are presented :—

	Pen Manure at 10 tons/arp.		*No Pen Manure*	
	Tons cane per arpent	*Comparative Yield*	*Tons cane per arpent*	*Comparative Yield*
No N	23.9	100	22.4	100
30 kgs. N/arp	29.6	124	30.2	135
60 kgs. N/arp	30.8	129	32.4	145

The above figures are derived from a total of about 80 experiments.

It is obvious, from the above figures, that where and when a normal Nitrogen fertilization is resorted to, no benefit is derived from an application of pen manure. Organic matter, although essential to soil fertility, needs not be applied to sugarcane soils. These soils are not only very rich in organic matter, but an application of 10 tons of pen manure, every rotation, is extremely low compared to the enormous amount of organic matter which is supplied yearly to the soil by a crop of sugar cane in the form of roots, trash and green leaves, even after allowing for the green leaves which are taken off the field as fodder.

Lime Trials

This series consisted originally of five trials located in the humid and superhumid zones of the island.

The layout adopted is a $3 \times 3 \times 3$ factorial design, with every combination of Lime, Potash and Magnesia, at three levels each. Of the 5 trials, one had to be abandoned, because a drain was made to pass on the site of the experiment.

The fertilizers applied to these trials are given below :—

	Kgs. per arpent		
	0	1	2
Muriate of Potash	nil	75	150
Sulphate of Magnesia	nil	25	50

No lime was applied to the first ratoons, so that it is the residual effect of the lime application at planting that is considered.

The trials were harvested in first ratoons, and the results are presented below :—

TABULATED RESULTS OF LIME TRIALS (1950)

Comparative Yield of Millable Cane

	Lime			*Potash*			*Magnesia*		
	0 *Ca*	1 *Ca*	2 *Ca*	0 *K*	1 *K*	2 *K*	0 *Mg*	1 *Mg*	2 *Mg*
Riche Bois ...	100	99	97	100	106	107	100	97	95
Bénarès	100	107	108	100	105	101	100	93	97
Henrietta ...	100	108	108	100	99	102	100	107	107
Olivia	100	94	95	100	93	95	100	100	96
Gen. Average Tons/arpent ...	29.2	29.8	29.9	29.3	29.7	29.8	30.0	29.6	29.4
Comparative Yield	100	102	102	100	101	102	100	99	98

RESULTS OF STATISTICAL ANALYSIS OF LIME TRIALS

Locality	*Linear Response*			
	Ca	*K*	*Mg*	*Sig. diff : (20 : 1)*
Riche Bois	— 0.9	+ 2.5	— 2.1	± 3.4
Bénarès	+ 2.7	+ 0.3	— 0.9	± 3.6
Henrietta	+ 2.0	+ 0.5	+ 1.6	± 1.9
Olivia	— 1.2	— 1.3	— 1.1	± 2.8
AVERAGE ...	+ 0.7	+ 0.5	— 0.6	

It is seen from the above table that the average response for the series to either Lime, Potash and Magnesia, is small and probably not significant ; but it will be noted that in one trial, there is a significant response to lime application.

Sugar analyses were made on composite samples of cane from these trials at harvest, with the following average results :—

	Lime			*Potash*			*Magnesia*		
	0	*1*	*2*	*0*	*1*	*2*	*0*	*1*	*2*
C.C.S. per cent cane (1950) ...	14.2	14.0	14.3	14.6	14.0	14.7	14.5	14.2	14.4
Tons C.C.S. per arpent ...	4.15	4.17	4.28	4.28	4.16	4.38	4.35	4.20	4.23
C.C.S. Average for 2 crops ...	14.30	14.25	14.20	14.50	14.25	14.75	14.40	14.20	14.30

The main object of these lime experiments is to find out whether

applications of lime or magnesia are justified in the humid and super-humid zones of the island. This object can be reached by laying down trials of a less complex nature than factorial experiments. Moreover, being given that Potash is already included in another series of trials, it was thought advisable to adopt a new layout on the Latin square basis with lime and magnesia at two levels each and combined. Two such trials have already been established and it is expected to extend the series this year.

Effect of differential fertilization on Sugar Content of Sugarcane

Composite samples of M. 134/32 were taken, as usual, from the factorial experiments and analysed at the Experimental Cane Mill of the Station.

The summarized data for the series are given below :

	Nitrogen			*Phosphoric Acid*			*Potash*		
	0	*1*	*2*	*0*	*1*	*2*	*0*	*1*	*2*
C.C.S. per cent cane (1950)...	14.36	14.23	14.14	13.95	13.90	13.63	14.06	14.40	14.10
Tons sugar per arpent ...	2.73	3.71	4.07	3.40	3.42	3.40	3.39	3.51	3.60
Comparative yield of sugar per arpent	100	136	149	100	101	100	100	104	106

The decrease in C.C.S. content due to the double dose of Nitrogen is here more than compensated by the increased yield of cane which was very high.

It is seen from the above figures that the single and double doses of Nitrogen have produced increases in yield of sugar amounting to 36 per cent and 49 per cent respectively. The corrresponding increases in yield of cane were 37 per cent and 52 per cent respectively.

The following figures are averages of about eighty experiments and show the gradual decrease in sugar content with increased Nitrogen application. No marked effect on sugar content is obtained following applications of either Phosphate or Potash.

Commercial Cane Sugar Per Cent Cane

		Nitrogen	*Phosphoric Acid*	*Potash*
0	...	12.96	12.65	12.60
1	...	12.81	12.79	12.79
2	...	12.60	12.73	12.65

Permanent Trials at C. E. S.

Bio 5. This trial has been carried out for almost 15 years, on the

same layout, with the object of comparing the effect of a complete fertilization with that of withholding Phosphate and Potash.

The results of the 6th ratoon crop and those of the rotation are given below :—

	6th Ratoon Crop Tons cane per arpent	Average (7 crops) Tons cane per arpent	Average (7 crops) Comparative Yield
Complete ...	28.4	31.2	100
Minus P ...	22.1	23.8	76
Minus K ...	13.3	20.4	65

Omission of Phosphate and Potash from the fertilizer mixture has resulted in an average reduction in yield of the order of 7.4 tons and 10.8 tons respectively.

The — K plots of the 6th ratoon crop yielded as low as 13.3 tons per arpent and typical Potassium deficiency symptoms were found on canes grown in these plots. The trial has been uprooted and a fourth rotation started, on the same layout, with the variety M. 423/41.

Trial 69. The object of this trial is to compare two varieties, viz: M. 134/32 and M. 423/41, at two different levels of fertilization.

The high fertilization consists of 60 kilogrammes N, 75 kilogrammes P_2O_5 and 60 kilogrammes K_2O per arpent and is four times as much as the low fertilization.

The virgin crop was harvested at 20 months with the following results :—

TONS CANE PER ARPENT

	High Fertilization	Low Fertilization	Response to Higher Level	Average
M. 423/41	50.1	33.2	+ 16.9	41.7
M. 134/32	35.0	24.8	+ 10.2	29.9
Average	42.6	29.0	—	—
M. 423/41 compared to M. 134/32	+ 15.1	+ 8.4	—	+ 11.8

Reference to the above table shows a better response of M. 423/41 to high fertilization as compared to M. 134/32. This is interesting to note, as a very desirable character in a variety is its ability to respond to fertilizer applications.

Bio 6. This trial was undertaken, many years ago, in order to investigate whether the subsoil could be rendered productive, by proper treatment.

It consisted of 5 replications of a randomized block, in which soil, subsoil and a mixture of soil and subsoil were treated with phosphatic fertilizers and farmyard manure.

This trial, under M. 134/32, was harvested in 4th ratoons.

The difference in yield of cane between the soil and subsoil plots,

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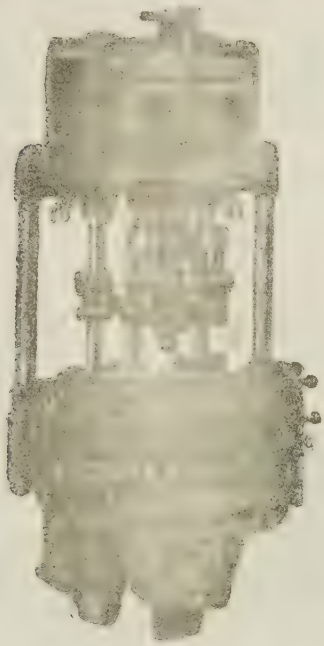

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which was very marked at the beginning of the rotation, has gradually disappeared and is not evident at all, in the fourth ratoon crop. This is probably due to the fact that the plots being so small, there has been a certain washing away of the top soil from one plot to another.

If the average figures for the complete rotation are considered, it appears that there is still a greater response to Phosphate in the subsoil plots than in the soil plots :—

	Tons cane/arpent		*Response to Phosphate Application*
	Phosphate	*No Phosphate*	
Soil	31.7	20.0	+ 11.7
Soil + subsoil ...	32.0	21.4	+ 10.6
Subsoil	32.2	18.7	+ 13.5

It can be concluded from the above figures that subsoil fertility may be improved by appropriate phosphate applications.

Fertilizing Value of Crushed Basalt

The investigations on the fertilizer value of crushed basalt have been continued along the lines laid down in previous years.

A. Field Experiments.

1. *Belle Rive Latin Square.* It is unfortunate that this exreriment which is the oldest in the basalt series and which has already yielded information of a most important nature on the value of basalt was harvested for the second time without the Station being informed.

2. *Hermitage Basalt Trial.* The $3 \times 2 \times 2$ factorial experiment at Hermitage was harvested this year in second ratoons and yielded the following average results :—

	Tons cane per arpent
0B—No Basalt	32.4
1B— 91 tons Basalt per arpent	34.2
2B—182 tons Basalt per arpent	37.2
Significant difference (20 : 1)	± 2.5

The above figures show, once more, that the double dose of basalt has caused a significant increase in yield over both the control and the single dose.

The following figures give the yield produced by the two varieties and by the two levels of fertilization :—

Variety	*Tons cane per arpent*	*Fertilization*	*Tons cane per arpent*
M. 134/32	33.5	Single fertilization	34.3
M. 63/39	35.7	Double fertilization	34.9
Significant difference (20 : 1) ...	± 2.1	Significant difference (20 : 1)	± 2.1

The double fertilization did not give significantly better yields than the single fertilization, which consisted of 30 kilograms N, 25 kilograms P_2O_5 and 25 kilograms K_2O per arpent.

M. 63/39 once more outyielded M. 134/32 by a significant margin.

The average response to applications of basalt for the three crops is given below :—

	Tons cane per arpent		
	0B	*1B*	*2B*
Virgin crop	31.9	33.6	36.3
1st ratoon crop	26.7	29.8	32.6
2nd ratoon crop	32.4	34.2	37.3
TOTAL for 3 crops ...	91.0	97.6	106.2

The above figures show a gain of 15.2 tons of cane for 3 crops or an average of 5 tons per crop, following a single application of basalt at planting. It will be interesting to see how long this cumulative effect of basalt will last and also how long it will take to repay the cost of application of the basalt.

Composite samples of cane, from the basalt experiment, were analysed for sugar with the following results :

COMMERCIAL CANE SUGAR % CANE

	M. 134/32	*M.* 63/39	*Average 2nd ratoon*	*Average for 3 crops*
0B	12.25	11.50	11.90	11.18
1B	12.70	11.70	12.20	11.44
2B	12.00	12.20	12.10	11.30

The general average figures for the three crops suggest a slight gain in sugar content following basalt application.

B. POT EXPERIMENTS

A series of pot experiments was started a year ago in order to determine which of the constituents of basalt is responsible for the increase in yield resulting from an application of the crushed rock. Details of the experiment were given in last year's report.

Four crops of oats have been grown in these pots and the series is being continued. Only remarks of a general character will be made, at this stage, on these experiments :—

(*a*) The beneficial effect of basalt is only evident on the more laterized soil type, i.e., the less fertile soils.

(*b*) Lime and potash show a beneficial effect on the Mon Désert and Cascade type, but not on the Ebène type of soil.

(*c*) No beneficial effect was observed by the addition of Magnesia.

Foliar Diagnosis

As stated previously, a certain amount of analytical work was carried out. Leaf punches, collected for foliar diagnosis, from the factorial experiments since 1949, were analysed for N and P_2O_5.

It was unfortunately not possible to carry the K_2O determinations owing to shortage of staff and delay in delivery of equipment and reagents for rapid tests. It is expected, however, that these results will be available very shortly.

Phosphate. The following data are connected with one trial which showed a definite response to P_2O_5 :—

P_2O_5 applied in kgs. / arp.	*P_2O_5 % Dry matter of leaf punch*	*Tons cane per arpent*	*Comparative Yield of Millable Cane*
0	0.38	25.0	100
25	0.40	28.4	114
50	0.44	32.0	128

Four other trials showed a response to P_2O_5, which however failed to reach significance.

The following are the results obtained from these trials which show a slight response to P_2O_5 :—

P_2O_5 applied in kgs. / arp.	*P_2O_5 % Dry matter of leaf punch*	*Tons cane per arpent*	*Comparative Yield of Millable Cane*
0	0.41	26.1	100
25	0.52	27.0	103
50	0.53	28.8	110

Ten other trials showed no response to P_2O_5. The data in connection with these are :—

P_2O_5 applied in kgs. / arp.	*P_2O_5 % Dry matter of leaf punch*	*Tons cane per arpent*	*Comparative Yield of Millable Cane*
0	0.49	26.3	100
25	0.51	26.5	101
50	0.49	25.4	97

After consideration of the above figures, it is seen that a big response is obtained with an initial P_2O_5 figure of 0.38 per cent, a slight response when P_2O_5 is 0.41 per cent and no response at all at the 0.49 per cent level.

This in accordance with the optimum already adopted for P_2O_5 which is 0.45 per cent dry matter of the leaf punch.

Nitrogen. The following figures give the average Nitrogen content of all the fertilizer trials for the 4 ratoon crops.

It should be remembered that all these trials responded to Nitrogen fertilization :—

	N% dry matter leaf punch		
	0 N	1 N	2 N
1st ratoon 1947	1.45	1.70	1.87
2nd ratoon 1948	1.57	1.81	1.96
3rd ratoon 1949	1.13	1.34	1.53
4th ratoon 1950	1.20	1.37	1.51

Reference to the above table shows that low figures were obtained for the last two ratoons, as compared to the optimum previously adopted for N, namely 1.85 per cent.

These low figures, however, compare well with the average N content of leaf punches of estate fields under normal fertilization.

On the other hand, there is no indication of a lowering of N content in old ratoons ; past experience has tended to show that all ratoons are comparable in this respect.

Is this discrepancy due to variations in climatic conditions prevailing at time of sampling ?

Is N more susceptible to these variations than P_2O_5 and K_2O ?

One point, however, needs mentioning : whereas P_2O_5 and K_2O contents of leaves in one year are closely correlated to those of the previous year, no such correlation is obtained for Nitrogen.

For the time being, therefore, and until the above questions will have been answered, the optimum for Nitrogen will be revised, so as to take into consideration the low figures mentioned above, and the optimum suggested will be 1.65 per cent dry matter of leaf punch.

Pre-treatment of Sugarcane Sets

Test of New Substances. Of the three trials laid down in 1949 at Labourdonnais, Bénarès and Ferney Sugar Estates, to test the effects of pre-treating sugarcane sets on Pineapple disease incidence and yield of cane at harvest, only the one at Labourdonnais could be completely harvested. The trial at Bénarès and part of the one at Ferney were harvested by these estates through an oversight.

The number of cuttings infested with Pineapple disease in these experiments is as follows :—

Estate :—	*Labourdonnais*	*Bénarès*	*Ferney*
Number of cuttings per plot	200	260	160
Treatments	*Average number of infested cuttings per plot*		
Control	1.25	13.00	11.8
Aretan 1 %	1.50	2.25	1.2
Abavit S 1 %	0.00	0.00	1.4
Agrosan GN 1 %	0.25	1.75	0.8
Lime solution 10 % ...	—	—	9.2
Significant difference ...	Not calculated	± 3.2	± 5.0

The results of these trials confirm, on the whole, previous findings that Aretan, Abavit S and Agrosan GN, are effective in controlling Pine-apple disease. It is not possible to draw any conclusion regarding the yield results due to the fact that full data have only been obtained for one trial.

Investigations on Yield Effects of Interplanting Foodcrops with Sugarcane

Of the four trials established in 1949, only three could be reaped in 1950. The trial at Bénarès was harvested by the estate itself without the plot yields being recorded.

Five new trials have been planted out in 1950 at Britannia, Grande Rosalie, Mon Désert-Mon Trésor and Solitude Sugar Estates and at the Hermitage Experimental Station, and will be cut in 1951.

All these experiments have been laid down on the Latin Square design as the previous ones.

The results of the experiments reaped in 1950 are given in the following tables :—

Ferney S. E. (First Ratoon)

Date of harvesting (a) virgin canes : 8.12.49 ; (b) ratoon : Nov. 1950
Sugarcane variety : M. 134/32.
Foodcrops interplanted : Maize and groundnuts.

Treatments	*Tons cane per arpent*	
	Virgins	*First Ratoon*
1. Sugarcane alone	32.5	37.4
2. Sugarcane with maize in alternate interline ...	31.6	31.2
3. Sugarcane with groundnuts in alternate interline	30.5	33.9
Significant difference (20 : 1)	± 6.3	± 6.3

The results in plant cane are given for comparison purposes. Although the differences between treatments 1 and 2 and 3 are higher in first ratoon, they are again not significant.

The maize yields have been given in the 1949 Annual Report.

Mon Desert—Mon Tresor S. E.

Sugarcane Variety : M. 63/39
Time of planting sugarcane : beginning of June.
Time of planting foodcrops : „ „
Foodcrop interplanted : maize.

The maize plants made good growth despite the gravelly soil, and when the ears started maturing, they were bent down to prevent depredation by birds. The canes were harvested about fifteen months after planting, with the following results :—

Treatments	*Tons cane per arpent*
1. Sugarcane alone	54.9
2. Sugarcane with maize in alternate interline	47.1
3. Sugarcane with maize in every interline ...	47.8
Significant difference	± 20.6

The experimental error is much too high to allow of any conclusion being drawn regarding the yield of cane in the different treatments.

The maize gave the following yields per arpent :—

	Kgs.
In treatment 2 ...	372
In treatment 3 ...	815

PETITE ROSALIE

Date of planting sugarcane (Var : M. 134/32) : Mid-March.

Date of planting foodcrops : Beginning of April.

Foodcrops interplanted : maize and tomatoes.

Growth was excellent and stands were very regular, but the yields, produced by the foodcrops suffered considerable reduction due to the maize cobs being attacked by birds, and the tomato plants drying up after the first harvest as a result of unfavourable weather conditions :

The canes were cut when seventeen months old, with the following results :—

Treatments	*Tons cane per arpent*
1. Sugarcane alone	35.2
2. Sugarcane with maize in alternate interline	34.1
3. Sugarcane with tomatoes in alternate interline	34.5
4. Sugarcane with maize in one interline and tomatoes in the other interline	39.3
Significant difference	± 4.4

Curiously enough, yield of cane has been higher for treatment 4 than for treatments 2 and 3. The difference between treatments 1 and 4 is high but not significant.

The average yield of the foodcrops are as hereunder :—

		kgs. per arpent
Treatment 2	— maize	355
Treatment 3	— tomatoes	716
Treatment 4	— maize	269
	— tomatoes	643

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Time of planting sugarcane (Var : M. 134/32 : Mid-April).
Time of planting foodcrops : Mid May.
Foodcrops interplanted : Maize and Dholl Kessari.

Growth of the maize seedlings was checked due to a slight attack by borers, but the plants subsequently recovered after a spell of rain. The young dholl Kessari seedlings were damaged by birds which uprooted them to eat the seeds soon after germination, and recruting had to be resorted to in order to obtain regular stands. Some seeds were lost at harvest through bursting of the pods which had reached an advanced stage of maturity, but not in such a quantity as to affect the results of the experiment.

The trial was harvested at the begining of September, that is, when the canes were about 17 months old, the results being as follows :—

Treatments	*Tons cane per arpent*
1. Sugarcane alone	23.8
2. Sugarcane with maize in alternate interline	23.0
3. Sugarcane with dholl Kessari in alternate interline ...	23.0
4. Sugarcane with maize in one interline and dholl Kessari in the other interline	26.5
Significant difference	± 2.9

These results, although also apparently abnormal, are very similar to those obtained at Petite Rosalie, and will be discussed further.
The foodcrops gave the following yields :—

Treatments	*Yield in kgs. per arpent*
Treatment 2 — Maize	202
Treatment 3 — Dholl Kessari	77
Treatment 4 — Maize	217
Treatment 4 — Dholl Kessari	87

Conclusion. Summing up the results of the above trials, it may be inferred that :

(*a*) although there has been a reduction in yield of cane in two trials, due to the planting of foodcrops, the reduction is not statistically significant.

(*b*) in the other two trials, the plot containing sugarcane, maize and either tomatoes or dholl Kessari, have produced higher yields of cane than the control plots but the differences in yield are not significant. The results which appear abnormal *a priori*, are probably due to the fact that the cane may have benefitted from the total larger amount of artificials given to the foodcrops when these occur in every cane interline. This assumption appears to be borne out by the fact that cane yields have been

significantly higher in plots with two foodcrops than in those with one foodcrop only. It must, however, be pointed out that these results contradict the 1949 results which appear more rational.

It is needless to emphasize that the results of many more experiments will probably be necessary before the effects of interplanting foodcrops with sugarcane can be objectively assessed. It must be borne in mind that such experiments are of a complex nature, due to the interplay of a considerable number of factors comprising, *inter alia*, the nature of the foodcrops grown and their frequency of occurrence in the canes' interlines, the interval between the dates of planting the cane and foodcrops, the amounts of artificials applied to the cane and food crops, the differential effects of climate on the growth of the various crops under test, the localisation of the experiment, etc. The extent to which poaching takes place depends on the simultaneous effects of a number of these factors.

One of the difficulties inherent in the cane-foodcrops trials is the assessment of the adequate amounts of fertilizers to be applied to the foodcrops. It must be admitted that this is a difficult question, when it is remembered that the fertilization of sugarcane itself is not exactly known.

The planting of sugarcane and secondary crops in the same field is fundamentally an economic problem which resolves itself into determining whether the benefit derived from the cultivation of these crops is not offset by reduction in cane tonnages.

SOCIÉTÉ DES CHIMISTES ET DES TECHNICIENS DES INDUSTRIES AGRICOLES DE MAURICE

Procès verbal de l'Assemblée Générale annuelle du 8 février 1952.

Cette réunion a eu lieu a l'Institut, à midi, sous la présidence de M. Pierre Halais, Président.

Les membres suivant étaient présents :

MM. Louis Léon Bauristhène, Ernest Bouvet, Jacques Dupont de Rivaltz de Saint-Antoine, Jean Halais, Capitaine Marius d'Hotman, Pierre Martin, René Noël, Vivian Olivier, Stanislas Pelte, Régis Pilot, Longchamp Pitot, Maxime de Robillard, Roland de Robillard, Guy Rouillard, Aimé de Sornay, Pierre de Sornay, Serge Staub, Frédéric Tennant, Cyril Theveneau, Philippe Tournois, Christian d'Unienville, Jean Vinson, Adrien Wiehe et George Wiehe jr.

Trente deux autres membres s'étaient fait représenter.

Le Président ouvre la séance et avant de passer à l'ordre du jour demande à l'assemblée d'observer une minute de silence en signe de deuil à l'occasion du décès de Sa Majesté le Roi George VI.

Le Président invite M. Maurice Paturau, trésorier, à présenter l'état de situation de la Société au 31 décembre 1951.

Cet état de situation, qui est audité par MM. Léon de Froberville et Adrien Wiehe, déclare une balance en caisse de Rs. 1,306.13 et est adopté par acclamation.

L'assemblée nomme ensuite deux vérificateurs aux comptes pour l'exercice en cours. Ceux de l'année 1951 sont de nouveau choisis.

Le Président donne alors lecture de son rapport annuel sur les activités de la Société pendant l'année 1951.

M. Vivian Olivier, secondé par M. Pierre de Sornay, propose un vote de félicitations à M. Halais pour l'excellent travail accompli par la Société pendant sa présidence.

On procède ensuite à l'élection du comité pour 1952. Les membres suivants sont élus :

MM. Adrien Wiehe	... ...	55 voix
André Martin	... ...	52 „
Vivian Olivier	... ...	50 „
René Lincoln	... ...	41 „
George Park	... ...	39 „
Maurice Paturau	... ...	37 „
Aimé de Sornay	... ...	36 „
Alfred Leclézio	... ...	35 „

Soixante six membres avaient pris part à ce vote.

L'ordre du jour étant épuisé la séance est levée à 14 heures 15.

A. DE SORNAY — *Secrétaire*

P. HALAIS — *Président*

DOCUMENTATION TECHNIQUE

GARAYAR, H. N. — *Comment accélérer la croissance des greffons* — (AGRONOMIA, PÉROU, 1950, vol. 15, No. 64, pp. 51-53. FRUITS, vol. 6, No. 10, Nov: 1951, p. 230.

On y arrive en courbant le sujet, au lieu de le couper après la reprise de la greffe, l'extrémité du porte-greffe est attachée à la base du plant. On coupe la partie courbée du porte-greffe lorsque l'extrémité du greffon a de grandes feuilles et que la base est arrondie.

V. O.

DE BONIS, E. — *Influence de l'heure de la récolte des feuilles de tabac sur leur teneur en substances azotées et glucides* — TOBACCO, 1951, (LV), No. 619, Fev., pp. 64-72 et INDUSTRIES AGRICOLES ALIMENTAIRES, Sept.-Octobre 1951, No. 9-10 p. 509).

Influence très sensible de l'heure de la récolte sur la quantité et la composition des glucides dans les feuilles du tabac Virginie Bright (mais non dans celles du tabac Maryland). — Quantité d'azote total à peu près égale chez tous les tabacs qu'elle qu'ait été l'heure de récolte ; teneur sensiblement moindre en azote protéique (et, par suite, qualité meilleure) des tabacs récoltés la nuit.

V. O.

LAL, K. W., RAYAT DE & SUBRA RAO, M. S. — *Recherches sur la physiologie des cultures. Influence des carences en N. P et K sur le quotient respiratoire des feuilles de la canne à sucre.* — (Studies in crop physiology. Effect of N, P et K deficiencies on respiration rate of sugarcane leaves). PROC. INDIAN ACAD. SCI., 1951, No. 1, Janv. pp. 1-13. et IND. AGR. ET ALIMENTAIRES, Sept.-Octobre 1951, p. 509.

Expériences sur la respiration, à différents stades de leur développement, de cinq variétés de canne à sucre recevant une nutrition complète, ou déficiente en N, P ou K. — Variations considérables de la respiration, dues aux conditions de nutrition, et probablement déterminées par des variations de composition chimique des feuilles.

V. O.

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BIBLIOGRAPHIE

A. TOUSSAINT : *Early Printing in the Mascarene Islands* (1767-1810), G. Durassié & Cie., Editeurs, Paris, 1951. 165 pp., illus.

(En vente à Maurice chez Rogers & Co., à Rs. 15 l'exemplaire).

Cet ouvrage est la thèse présentée à l'Université de Londres en 1947, pour le Doctorat en Philosophie (Ph. D.), par le Dr. A. Toussaint, Conservateur des Archives de l'Ile Maurice.

Le Dr. Toussaint retrace l'histoire des débuts de l'imprimerie aux Iles de France et de Bourbon jusqu'au moment de la conquête britannique de ces îles.

Pour préparer cette thèse, l'auteur a dû examiner les moindres livres et pamphlets sur les sujets les plus divers qui furent imprimés aux îles de 1767 à 1810. Ces " incunables " qu'il analyse en détail, comprennent plusieurs opuscules ignorés jusqu'ici sur l'agriculure et les sciences physiques. De ces ouvrages, il faut signaler particulièrement les travaux de Joseph François Charpentier de Cossigny, membre correspondant de l'Académie des Sciences, sur la culture du caféier, des arbres à épices et de l'indigotier.

Le Dr. Toussaint s'étend assez longuement dans son livre sur l'œuvre agricole accomplie et donne, à l'appendice XI, un relevé complet des travaux et études de ce dernier.

Sa thèse qui est, par ailleurs, très solidement documentée, et d'une excellente présentation, se signale donc à l'attention de tous ceux qui s'intéressent à l'histoire agricole de notre petit pays.

A. de S.

INTERNATIONAL SUGAR COUNCIL*

The International Sugar Council met in London from the 1st to 5th of March, 1952.

The following communiqués were issued to the Press at the close of the meeting : —

The Statistical committee of the International Sugar Council at meetings in London on 29th February and 3rd March drew up an estimate of the free market sugar position for the crop year ending 31st August, 1952.

Estimated supplies are 6,507,000 metric tons ; estimated requirements are 5,250,000 metric tons resulting in an estimated addition to stocks of 1,257,000 metric tons (all raw value). The supply figures include a figure of 3,240,000 metric tons for Cuba, arrived at as follows :—

1952 production estimated by Cuban Delegate on 1st March		6,180,000
Local consumption	292,000	
United States free quota	1,927,000	
U.S. reserve quota to cover possible additional sugar requirements in U.S. in 1952 or 1953	721,000	2,940,000
4th March, 1952		3,240,000

The Special Committee set up by the International Sugar Council in August, 1948 to study the sugar situation, the desirability of a new International Sugar Agreement and the bases for such an Agreement, met in London from the 1st to 5th March, 1952, under the Chairmanship of Baron Kronacker.

It was attended by representatives of 19 Governments, by Observers from 6 other Governments and an Observer from F.A.O.

The committee heard statements by Delegations on the world sugar situation and their position in regard to a new Agreement. A draft of an Agreement prepared by the Chairman was before the Committee which decided that it should supersede all earlier drafts for the purposes of the Committee's future work.

It was also agreed that the Chairman, at the request of any delegation, might have further studies made of any special problems and that any delegation at a time it considers opportune might ask the Chairman to summon another meeting with a view to calling upon the United Nations to convene an International Conference for the discussion of a new International Sugar Agreement.

5th March, 1952

* From *Mauritius Sugar News Bulletin* No. 14, 17th March 1952.

1o. Climatological Returns for January and February, 1952.

A. Rainfall in Inches (a) and Difference from Normal (b)

Period		West		North		East		South		Centre	
		a	b	a	b	a	b	a	b	a	b
JAN.	1 — 15 ...	2.18	—1.45	1.20	—2.56	3.17	—2.28	2.50	—2.91	3.55	—2.54
„	16 — 31 ...	1.83	—2.29	1.46	—2.92	2.24	—4.01	3.04	—3.26	4.49	—2.86
FEB.	1 — 15 ...	5.57	+1.66	4.84	+0.58	6.34	+0.13	5.94	—0.18	10.45	+3.17
„	16 — 29 ...	2.07	—1.47	1.28	—2.48	7.26	+1.57	4.74	—0.69	5.43	—0.87

B. Temperature — Difference from Normal of Temperatures Averaged over the Whole Island.

Period		Max. °C	Min. °C
JAN.	1 — 15	+ 0.4	+ 1.1
„	16 — 31	+ 0.9	0.0
FEB.	1 — 15	+ 0.3	+ 1.0
„	16 — 29	— 0.8	— 0.5

C. Wind Speed in Knots.*

Period		Pamplemousses		Plaisance		Vacoas	
		Mean of highest hourly velocity of each day	Absolute highest hourly velocity	Mean of highest hourly velocity of each day	Absolute highest hourly velocity	Mean of highest hourly velocity of each day	Absolute highest hourly velocity
JAN.	1 — 15 ...	12	18	10	17	12	19
„	16 — 31 ...	11	19	7	16	9	19
FEB.	1 — 15 ...	10	17	7	13	10	16
„	16 — 29 ...	13	21	7	13	13	23

* To convert into miles per hour multiply by 1.151.

SUGAR PRODUCTION (Preliminary Compilation) CROP 1951

	SUGAR OUTPUT (Estate Weights) KILOS
Union Flacq	35,834,120
Mon Désert	28,400,000
Mon Loisir	28,157,145
Médine	27,012,000
Saint Antoine	26,550,000
Beau Champ	25,663,090
Savinia	23,179,886
Mon Trésor	22,455,212
Mount	22,000,000
Beau Plan	19,855,251
Constance	19,049,000
Highlands	17,845,420
Labourdonnais	17,412,900
Solitude	16,907,300
Union Saint Aubin	16,167,785
Queen Victoria	15,629,018
Britannia	14,829,768
Belle Vue	13,319,440
Rose Belle	12,904,000
Riche-en-Eau	12,354,545
Bénarès	12,137,000
Réunion	10,868,656
Trianon	9,885,000
Bel Ombre	9,342,300
Saint Félix	8,915,085
Ferney	8,829,480
Beau Vallon	8,400,345
TOTAL	483,903,746

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MAURITIUS SUGAR CROP 1951/52*

Sugar Production and Exports :

	Metric tons
Preliminary Compilation of Current Crop	483,904
Estimated Exports of Current Crop Year	463,000
Total Exports as at 29th February, 1952	405,237

Destination of Exports :

United Kingdom ...	237,790
Canada	8,768
Malaya	1,016
Mombassa	6,594
Zanzibar	3,774
Dar-ès-Salam	5,479
Aden	4,226
Ceylon	93,799
Hong Kong	31,893
Seychelles	571
Berbera	508
S. Rhodesia (via Beira)	10,819
	405,237

Local Sales to the 29th February, 1952	11,240
Stock in hand at 29th February, 1952	67,427

Production was slightly short of the estimated figure of 490,000 tons as a result of the lower sucrose content of the canes in comparison with the previous year. On the other hand average yields of canes in the fields were much higher than in 1950/51, rising from 24.6 tons to 27.6 tons per acre on the preliminary figures, but this increase did not quite make up for the lower sucrose content.

Duration of Crop :

First factory started crushing	—	26th June, 1951
All 27 factories in operation	—	8th August, 1951
Last factory finished crushing	—	18th January, 1952

Factory Work (Preliminary Results) :

Sucrose % Canes	13.03
Commercial Sugar Extraction % Canes ...	11.11
Average Polarisation	98.4°

* From *Mauritius Sugar News Bulletin* No. 14, 17th March, 1952.

Cultivation (Preliminary figures) :

	Due to be harvested Arpents (1.043 acre)	*Yield of Canes (Metric Tons)*
(i) Millers' Lands	75,459	2,486,680
(ii) Farmers' Land	82,255	1,868,433
	157,714	4,355,163

Estimated yield of canes per arpent = 27.6 tons.

SUGAR EXPORTS DURING CALENDAR YEAR 1951

Countries of Destination	CROP 1950 Exports from Jan. '51 to July '51	CROP 1951 Exports from July '51 to Dec. '51	TOTAL EXPORTS Calendar Year 1951
	M/TONS	M/TONS	M/TONS
United Kingdom ...	61,535.680	215,115.036	276,650.716
Canada	5,021.291	8,767.828	13,789.119
East Africa :			
Mombasa	7,495.168	4,887.126	12,382.294
Zanzibar	2,220.760	3,367.773	5,588.533
Dar-ès-Salam	3,035.164	3,469.477	6,504.611
Tanga	3,020.670	—	3,020.670
S. Rhodesia (via Beira) ..	—	10,295.808	10,295.808
Aden	4,812.781	4,226.014	9,038.795
Berbera (British Somaliland) ...	—	507.997	507.997
Ceylon	59,312.686	61,481.414	120,794.100
Malaya	—	1,016.000	1,016.000
Hong Kong	21,397.942	24,070.013	45,467.955
Seychelles	402.056	164.627	566.683
TOTAL	168,254.198	337,369.083	505,623.281

Sugar Sales—Local Consumption—Calendar Year, 1951 :

	Metric Tons
Whites	12,091.233
Raws	8,309.980
TOTAL ...	20,401.213

TABLEAU SYNOPTIQUE

RÉSULTATS DE LA COUPE 1951

(Compilation faite par le Service de Technologie Sucrière du Département d'Agriculture)

Noms et Numéros d'ordre des Sucreries	Cannes. Richesse	Cannes. Ligneux %	Jus de 1ère Pression °Brix	Jus de 1ère Pression Pureté apparente	Jus de dernière Pression °Brix	Jus de dernière Pression Pureté apparente	Jus mélangé. °Brix	Jus mélangé. Pureté apparente	Jus mélangé. Quotient glucosique	Jus mélangé. Poids% cannes	Grammes chaux hydratée utilisés par tonne cannes.	Dilution% jus absolu (poids)	Bagasse. Pol.	Bagasse. Humidité %	Bagasse. Ligneux %	Bagasse. Saccharose perdu% cannes	Bagasse. Saccharose % ligneux	Bagasse. Poids % cannes	Jus déféqué Pureté apparente	Jus déféqué pH	Ecumes Pol.	Ecumes Poids % cannes.	Numéros d'ordre des Sucreries	Clairce concentrée °Brix	Clairce concentrée Pureté apparente	Jus absolu extrait o/o cannes	Saccharose dans le jus % saccharose des cannes	Saccharose dans le jus % saccharose des cannes ramené à une fibre de 12,5 %	Sucre réalisé. Sucre blanc extrait % cannes	Sucre roux extrait % cannes	Sucre bas-produit extrait % cannes	Sucre total extrait % cannes	Saccharose total extrait % cannes	Pol. moyenne des sucres	Saccharose extrait % Saccharose du jus	Saccharose extrait % Saccharose du jus ramené à une pureté de 85	Saccharose extrait % Saccharose des cannes	Pertes Pertes totales réelles % cannes	Pertes Pertes industrielles réelles % cannes	Mélasse Poids % Cannes	Mélasse Pureté Clerget	Nombre de jours de roulaison	Cannes écrasées à l'heure	Nombre de cylindres des tandems	Nombre de coupe-cannes	Moyenne d'heures de travail des moulins par 24 heures	Numéros d'ordre des Sucreries
26 Médine	14,10	11,55	19,35	88,0	2,68	70,1	15,54	85,8	3,9	101,8	1470**	27,3	2,58	45,8	50,6	0,59	5,11	22,0	86,1	7,2	8,5	1,86	26	60,9	85,0	86,5	91,6	95,4	2,73	9,52	—	12,27	12,05	98,4	89,6	88,2	85,6	2,64	1,41	2,79	33,9	129	82,1	15	2	21,5	26
10 Trianon	14,00	11,74	19,35	89,7	3,06	75,0	14,99	86,6	3,8	103,4	814*	22,8	2,60	43,9	52,6	0,58	4,94	22,3	87,0	7,2	6,1	2,72	10	58,0	88,1	84,1	93,8	95,5	—	12,12	—	12,12	11,97	98,8	89,2	87,7	85,5	2,03	1,45	2,58	37,7	115	37,3	14	1	19,0	10
25 St. Antoine	13,92	13,80	20,09	87,5	4,92	77,4	16,97	85,8	5,1	101,3	1179	11,7	3,25	47,8	47,9	0,95	6,89	28,8	85,5	6,9	8,3	1,71	25	56,0	84,9	79,7	93	93,9	—	11,65	—	11,65	11,11	98,2	86,6	85,7	82,2	2,48	1,58	3,20	28,8	154	67,1	12	2	21,8	25
22 Solitude	13,90	12,60	20,03	86,7	5,88	77,4	17,62	85,5	3,9	87,2	—	6,1	3,06	45,4	50,7	0,76	6,04	24,9	85,1	7,1	3,1	2,00	22	48,6	84,8	82,2	94,5	94,5	—	11,95	—	11,95	11,76	98,4	89,5	89,1	84,6	2,14	1,38	2,70	39,4	122	53,9	14	1	21,5	22
2 Highlands ..	13,80	10,30	18,36	89,1	2,70	73,3	14,24	86,7	4,5	107,4	920	25,6	2,63	47,6	48,8	0,56	5,44	21,1	87,7	7,8	5,6	1,75	2	63,9	87,6	85,5	91,0	95,0	—	12,40	—	12,40	12,21	98,5	92,3	91,1	88,5	1,59	1,03	—	34,7	117	55,4	11	1	22,2	2
23 La Bourdonnais ..	13,79	12,11	19,42	88,3	7,43	79,3	15,76	86,5	3,7	94,7	767	15,7	3,46	47,8	47,9	0,87	7,20	25,3	86,8	7,0	8,8	1,75	23	55,3	86,3	81,8	93,6	93,4	—	11,74	—	11,74	11,55	98,4	88,0	86,4	82,8	2,24	1,37	—	37,5	119	49,8	11		18,8	23
21 Belle Vue	13,77	11,32	19,42	85,5	6,59	74,1	17,12	84,0	3,6	89,8	900***	8,8	3,67	45,9	49,1	0,84	7,42	23,0	83,9	6,9	8,1	—	21	52,7	84,1	82,5	92,9	93,2	—	11,56	—	11,56	11,33	98,0	87,6	88,5	82,3	2,44	1,60	—	41,3	141	42,9	9	1	19,2	21
6 Mon Désert ..	13,61	10,63	18,43	88,8	5,06	75,4	15,85	86,9	3,5	94,7	730	11,4	2,72	46,2	50,2	0,58	5,46	21,2	87,1	7,1	10,5	1,39	6	56,8	87,4	85,0	95,8	94,9	—	11,87	—	11,87	11,69	98,5	88,3	86,3	85,9	1,92	1,34	2,63	38,8	117	100,6	15	2	18,7	6
11 Réunion	13,55	11,15	18,49	89,5	3,75	73,4	15,01	85,8	3,5	100,1	856	18,7	2,69	44,5	51,8	0,62	5,57	22,5	86,4	7,6	4,8	1,19	11	62,4	87,6	84,3	95,4	94,8	—	11,92	—	11,92	11,74	98,5	90,8	90,2	86,7	1,81	1,19	2,49	38,5	97	16,6	12	1	20,7	11
27 Beau-Plan	13,21	11,42	18,79	86,2	7,02	75,3	16,98	84,7	4,0	86,4	873	4,4	3,39	45,6	49,9	0,78	6,83	22,9	85,3	7,1	10,6	—	27	54,1	85,0	82,8	94,1	93,5	—	11,36	—	11,36	11,17	98,3	89,8	90,0	84,6	2,01	1,26	—	36,1	149	59,4	14	1	19,8	27
18 Mon Loisir ...	13,06	11,78	18,46	87,4	4,45	77,2	15,61	84,9	5,9	93,6	1250	11,6	2,61	44,9	51,7	0,59	5,01	22,8	83,7	7,1	2,2	3,20	18	53,9	85,0	83,9	95,6	95,3	—	11,28	—	11,28	11,09	98,3	89,0	89,1	84,9	1,97	1,38	3,20	36,4	152	79,2	14 +++	1	19,8	27
4 Rose-Belle ...	13,02	11,08	18,09	88,6	5,95	73,6	13,87	85,5	4,9	104,0	475	24,5	3,14	45,1	50,6	0,68	6,14	21,9	86,4	7,3	6,0	1,60	4	62,1	86,1	83,5	94,7	93,9	—	11,14	0,04	11,18	11,03	98,7	88,2	87,7	84,7	1,99	1,31	3,27	39,3	131	49,9	11	1	17,9	4
9 Savinia	12,85	11,17	18,06	88,4	4,54	71,6	14,12	85,6	5,1	101,0	—	23,8	2,87	48,2	47,8	0,67	6,00	23,4	85,7	—	7,0	—	9	58,2	86,2	81,1	94,8	94,1	—	10,83	—	10,83	10,67	98,5	87,5	86,9	83,9	2,18	1,51	—	38,5	132	84,3	12	1	19,3	9
5 M.Trésor&M.Déser	12,78	12,13	18,42	86,5	4,53	71,5	14,82	84,5	3,8	96,9	1050	17,1	2,59	47,2	49,2	0,64	5,28	24,7	83,4	7,1	6,9	—	5	60,7	83,0	82,7	95,0	94,8	—	11,15	—	11,15	10,99	98,6	90,6	91,0	86,6	1,79	1,15	—	34,4	129	78,9	12	2	19,8	5
7 Constance	12,69	11,65	18,05	86,6	3,87	70,5	14,25	84,2	4,4	100,4	1162	21,9	2,71	47,3	48,8	0,65	5,58	23,8	84,5	7,6	8,1	2,10	7	55,1	84,2	82,3	94,9	94,5	—	10,82	—	10,82	10,67	98,6	88,6	89,3	84,1	2,02	1,37	3,22	35,1	122	66,8	14	1	21,6	7
17 The Mount ...	12,66	10,54	17,80	86,2	5,22	73,2	13,50	84,1	5,4	105,8	—	25,5	2,82	49,3	46,9	0,63	5,98	22,5	84,4	7,0	2,4	—	17	62,4	84,3	84,2	95,0	93,9	—	10,94	—	10,94	10,77	98,5	88,2	89,0	85,1	1,89	1,26	—	37,1	144	72,4	14	1	19,4	17
13 Union-St Aubin ...	12,62	11,02	17,41	88,4	4,85	75,5	14,73	85,1	4,6	95,4	623	14,0	2,85	48,3	47,9	0,66	5,99	23,1	85,7	7,1	2,6	1,60	13	58,7	86,5	83,7	94,8	94,0	—	10,55	—	10,55	10,39	98,5	86,9	86,8	82,3	2,23	1,57	3,27	40,5	113	78,9	15	1	17,4	13
1 Britannia	12,58	12,49	17,47	86,4	4,32	74,7	14,68	84,8	5,2	95,5	580	15,6	2,80	45,4	50,9	0,69	5,53	24,6	85,4	7,4	9,0	—	1	64,3	84,2	82,7	94,5	94,5	—	10,84	—	10,84	10,63	98,1	89,4	89,6	84,5	1,95	1,23	—	39,7	135	57,0	11	2	18,1	1
12 Bel Ombre ...	12,58	12,68	18,01	88,5	7,65	77,3	15,22	84,8	3,7	90,8	677	13,7	3,38	45,4	50,2	0,85	6,71	25,3	86,0	7,2	8,1	—	12	57,3	86,9	79,8	93,2	93,3	—	10,46	—	10,46	10,29	98,4	87,8	88,0	81,8	2,29	1,44	—	40,8	127	41,5	11	1	16,9	12
24 Union-Flacq ...	12,57	12,42	17,56	87,3	6,55	78,2	14,99	85,3	5,8	92,1	753	12,9	3,25	44,9	51,0	0,79	6,36	24,4	85,6	7,2	2,2	2,20	21	54,5	85,7	81,5	93,7	93,6	—	10,70	—	10,70	10,54	98,5	85,5	89,2	82,9	2,03	1,24	2,88	35,5	142	125,4	12	2	18,8	24
8 Queen Victoria ...	12,50	11,93	17,84	86,9	4,80	74,3	15,64	84,1	6,7	89,7	1057	9,8	2,99	44,8	51,2	0,70	5,87	23,3	84,7	7,1	8,5	1,70	8	51,5	84,7	81,7	94,4	94,1	—	10,40	—	10,40	10,22	98,3	86,7	87,6	81,8	2,28	1,58	3,27	37,5	122	61,8	14	1	19,9	8
14 St Félix	12,49	11,93	17,97	86,6	4,71	71,8	15,18	83,5	4,1	92,7	1022****	13,8	3,12	45,1	50,6	0,74	6,21	23,8	84,4	7,2	6,6	—	14	60,7	84,8	81,4	94,0	93,7	—	10,24	—	10,24	10,09	98,5	85,7	87,2	80,8	2,49	1,66	—	38,8	118	40,4	12	1	18,2	14
20 Riche-en-Eau ...	12,39	12,39	17,56	88,0	4,81	75,7	14,66	85,2	5,7	94,4	754	—	2,43	45,8	51,0	0,59	4,77	24,3	85,7	7,3	7,1	—	20	65,0	86,1	83,0	95,2	95,2	—	10,57	—	10,57	10,43	98,7	88,4	88,2	84,2	1,96	1,37	—	37,5	125	48,7	12	1	19,2	20
15 Ferney	12,35	11,73	17,47	86,9	6,26	74,6	14,80	84,0	6,0	93,3	1340†	13,5	3,06	48,2	47,6	0,75	6,40	24,6	83,9	6,9	8,9	—	15	56,3	84,0	82,1	93,9	93,4	5,44	4,41	—	9,85	9,69	98,4	82,8	84,1	78,5	2,66	1,91	—	40,1	130	46,4	12	1	—	15
19 Beau Vallon ...	12,31	12,29	17,97	85,5	6,38	69,7	14,45	83,0	5,0	96,4	778	18,1	2,96	46,1	49,7	0,73	5,94	24,7	83,2	7,0	7,5	—	19	57,5	83,3	81,6	94,0	93,9	—	10,23	—	10,23	10,07	98,4	85,3	87,3	81,8	2,24	1,51	—	37,1	129	44,3	9	2	14,3	19
16 Bénarès	12,23	10,77	17,45	85,1	3,65	72,6	14,42	82,6	4,2	97,5	923	15,8	2,92	45,6	50,5	0,62	5,76	21,3	83,0	7,0	8,7	—	16	63,1	83,3	84,2	94,9	94,0	—	10,18	—	10,18	10,05	98,7	85,5	88,7	82,2	2,18	1,56	3,55	39,0	142	51,0	11	1	16,5	16
3 Beau Champ ...	12,20	13,04	17,58	86,4	7,27	74,9	15,66	83,5	5,5	87,1	940	7,7	2,93	48,3	47,7	0,80	6,14	27,3	84,5	7,0	2,9	1,87	3	55,8	83,5	80,8	93,5	93,7	—	10,02	—	10,02	9,85	98,3	86,1	87,8	80,7	2,35	1,55	3,72	38,0	154	85,7	18	2	19,4	3
Moyenne arithmétique..	13,02	11,77	18,33	87,4	5,14	74,4	15,21	84,9	4,6	96,0	912	15,8	2,95	46,3	49,7	0,70	5,95	23,7	85,2	7,2	6,6	1,92	—	58,0	85,3	82,8	94,6	94,2	—	—	—	11,08 ‡	10,90	98,4	88,1	88,2	83,7	2,12	1,42	3,06	37,9	131	63,5	—	—	19,3	—
Moyenne vraie	13,03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0,70	—	—	—	—	—	—	—	—	—	—	94,6	—	—	—	—	11,12	10,94	98,4	88,7	—	84,0	2,09	1,39	3,—	—	—	—	—	—	—

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* La première réunion des Actionnaires fut tenue le 14 Juillet 1838, à l'Hôtel Coignet, Rue du Gouvernement. Les Actionnaires élirent pour former le Comité de Direction :

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F. Barbé	O. C. Bourguignon	Y. J. Jollivet
J. Blyth	A. H. Giquel	Henry Koenig.